The
"ULTRADYNES"
of
Robt. E. Lácault

A Vintage Radio MONOGRAPH

by

D. H. MOORE

The
Vintage Radio
Foundation®

P.O. BOX 521
PALO ALTO, CALIFORNIA
94302

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TO ADVANCE THE WONDER & THE MAGIC OF EARLY RADIO
THROUGH THE COLLECTION, EVALUATION, & DISSEMINATION
OF INFORMATION.

DEDICATION

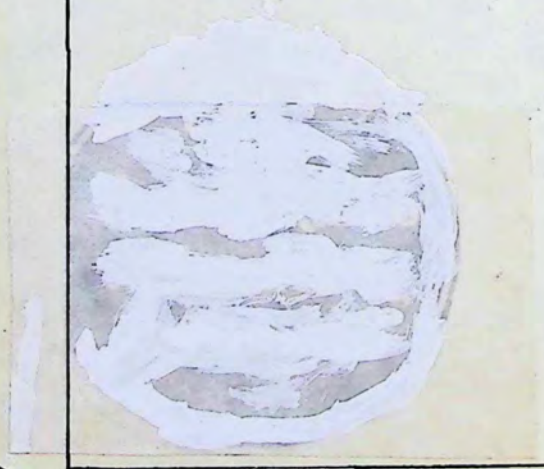
...to a way of life -
that should not have
been forgotten.

Autographed Edition

It is my sincerest wish that this latest contribution of my vintage radio writings may afford you as much enjoyment and usefulness as I've had in compiling it.

Over to you, and 73,

Palo Alto



Preface

These VINTAGE RADIO IDENTIFICATION SKETCH-BOOKS have appeared in three prior editions during the last few years, and have become accepted by university libraries and historical museums, as well as serious vintage radio hobbyists as a significant contribution and ongoing reference of the rise of Radio as a distinct social phenomenon. Through all editions, the purpose of these SKETCH-BOOKS has remained the same - to return a sense of the wonder and the allure of early radio by offering identifying construction instruction of hundreds of early circuits, hardware, accessories, and personally relateable items not to be found in Riders, Sams, Beitmann, et al.

It is important that the reader recognise that these SKETCH-BOOKS and MONOGRAPHS (see back-cover) are not, and were never intended to be, a comprehensive treatise embracing the entire field of early wireless communication, or a course in radio and electrical theory. They have been designed to be utilised by serious hobbyists.

A general knowledge of the vocabulary and the jargon of Radio has been assumed. The use of definitions and mathematical formulae has been deliberately avoided, as such information is readily available from other sources. However, if questions arise from any part of these SKETCH-BOOKS and MONOGRAPHS, the author will be pleased to have a go at answering such questions.

As the "bug" below states, the real fun of Radio has always been in doing it yourself, and not in merely collecting this or that marque and placing it on a shelf to gather dust, mute and motionless, and ambiguous to the non-hobbyist.

D.H.MOORE, A.D.I.

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A New Conception of Radio
A
New Kind of Receiver
No Dials - No Panel
Built-in Loudspeaker
ULTRADYNE
MODEL L-3

R. E. LACAULT
E. E. and A. M. I. R. E.

The contributions of Armstrong to the development of the Super-Het are too well known to repeat here, but one of the little known facts of his efforts was that he was working intimately with Lt. Levy of the French Signal Corps. The men, along with others, worked side-by-side, there in Paris, towards the same objective - interception of German signals.

The role of Levy and his 'boss', Latour, is rarely if ever mentioned these days, or the name of his most brilliant assistant - ROBERT E. LACAULT. French Military records happily show quite clearly that both men made the Super-Het happen.

Lacault, himself, had begun experimenting with wireless as early as 1912, earning a reputation throughout France before 1914. After the War he came to the U.S. and associated himself immediately with Gernsback. Later, he set-up as Phenix Radio; later as R.E.L. - Radio Engineering Labs, a name that turned on his initials. His development of the *ULTRADYNE* was a major contribution to the art, all detailed hereinafter.

It would appear that Lacault had only one formal photographic portrait made and it was used exclusively. The reproduction right is of the same pose as the lead-in photograph, poorly reproduced due to the aging of newsprint on which it originally appeared when Lacault resigned from Gernsback's media empire. I have been unable to find a cut of Alice, but I have always assumed that because Lacault was deemed a handsome man, Alice must have been a beauty. The copy below is the announcement in "Radio News" of Lacault's resignation, and was written by Gernsback, himself:

ROBERT E. LACAULT

> *"Mr. Robt. E. Lacault, who for the past four years has been Associate Editor of RADIO NEWS, has resigned from the editorial staff for other endeavours. Mr. Lacault has been for some time engaged in radio research, and recently decided to devote all of his energies to it. Mr. Lacault has contributed not a little towards the success of RADIO NEWS, and it is with regret that we see Mr. Lacault leave."*

In passing, it might be mentioned that such an announcement of the exitting of other Gernsback alumni did not occur. The time of the announcement above was 1924.

* * *

The advent of Lacault's "Ultradyne" circuitry in 1924 was, in itself, a major advance of the Radio art. His application of the modulator concept was a refinement of the theory first advanced in Paris by M.R.Jouhaust, in a paper presented to the French Academy of Science in the Summer of 1922. And because it was a true advance, it applications were quickly adopted by commercial manufacturers, and today is considered an essential part of all modern Radio circuits, even solid-state types.

While this was the period that witnessed a veritable niagara of patent litigations in the Radio industry which were to cascade until the Crash of '29, it seems that one could not patent a modification of a previously stated theory. So Lacault had to content himself with the knowledge that he had made a distinctive contribution.

Early on in the Kaiser's War he had become a commissioned officer of the French Signal Corps, the heart of all Allied communications.

He remained with the Signal Corps until the end of the war, and when he arrived in the U.S., Gernsback immediately hired him, much to the ire of Arthur Lynch. I have sometimes wondered if the fact that both men spoke fluent French had anything to do with it, as French was and is one of the three officual languages of Luxembourg.

Gernsback frequently referred to Lacault as his "most brilliant editor", an appellation Lynch felt was rightly his, and he resigned a short time later, thus setting the pattern for his subsequent yo-yo-like career in Radio. It must be admitted, however, that Lacault's contributions to Gernsback's media were rather conventional for the time, not truly original nor profound. Actually, originality and profundity were really not prerequisites of radio media of the period, merely attempts at excited promotion of the infant art. Lacault did exhibit strong impatience with wpople who asked obvious or tedious questions, it has been recorded, and while he gave of his knowledge freely and generously, he did have a few stubborn convixions.

He preferred to bread-board all of his circuits, and even wrote an editorial decrying the coming vogue of installing front panels on bread-boards. This attitude changed 180° a couple of years later when he designed the elegant "Ultradyne L-3" as a commercial venture. When he left Gernsback he set-up Phenix Radio Company, later Radio Electronic Labs, and later still a company with his initials - R.E.L. In the interim he continued to make contributions to several areas of Radio, such as designing a unique short-wave variable condenser, a 3-band tuning control, a micrometric tuning dial with gold or silver finish, etc.

His "Ultradyne" series were original modifications of the then-standard super-het theories. For example, instead of employong the first tube as a detector, he developed the "modulation" concept. The modulation concept of radio reception was always attributed to Lacault, but he openly admitted that he had been influenced by Jouhaust's theory. His thesis was that the modulation system used in transmitting could be used advantageously in radio broadcast reception. Such a system would do away with the detector, and incoming signals would modulate the output of the local oscillator. This is all illustrated in the pages which follow.

The modulator tube acted as a absorption shunt to the ocillatory circuit of the super-het, which was adjusted so that it produced the beat-notes. The plate of the modulator tube was supplied a constant flow of high frequency only, while the received oscillations were applied to the grid and filament. The concept obviously fascinated Lacault as contemporary reports related how he spent long Winter evenings experimenting furiously. Thus began the evolutionary cycle of the famous "Ultradyne" super-hets. In the following pages you will find all data pertaining to the complete series of "Ultradynes".

* * *

Stated another way, for the technically minded, the first tube was always the modulator, the second tube was always the oscillator. B+ was never applied to the plate of the modulator tube. This has always baffled some of our latter-day vintage radio hobbyists, and most of the enquiries I've received anent the "Ultradyne" always raised that fact as something requiring explanation. The plate of the modulator tube was tied to the grid of the oscillator.

The oscillator impressed an RF current on the plate circuit of the modulator tube, and since an incoming wave (signal) in actuality varied the resistance existing between the grid and the filament of the modulator tube, the flow of RF furnished by the oscillator would likewise be varied. Thus, local oscillations were modulated in accordance with the incoming signal. From that point on, the circuitry was more or less conventional for super-hets of the time.

The "Ultradynes", like the "Neutrodynes" could be precisely calibrated and a graph plotted against the wave-length for each dial.

* * *

Like other early Radio pioneers, Lacault produced several booklets on various aspects of Radio for the home-constructor. His booklets were competently written, without striking originality, but his first booklet - "How To Make A Complete Radio Phone Receiving Set" - followed the fashion then in vogue - an elementary treatise, giving instructions in a manner that any novice could actually construct a receiving set that would be quite servicable, either crystal or tube detection.

While Lacault's early writings were elementary, in light of present-day knowledge, we do not have the right to be smug or to feel superior, as it was because of such elementary writings on early Radio we drown today in a veritable niagara of "me-too" so-called electronic literature, most of which is a waste.

While I cannot envision easily a modern old radio buff going in for dipping strips of cardboard in paraffin or shellacing a Quaker Oats box to wind a coil form, such early writings comprise the historical literary basis of our hobby. Incidentally, the Quaker Oats boxes were always wrapt with #20 enamelled wire, full length, except for one-half inch on each end.

Among Lacault's early instructions were those suggesting a 200-foot aerial (antenna) and a Ground, consisting of a zinc or copper plate buried three feet in damp earth, or tossed into a near-by lake. A knife-switch lightning arrestor was also mandatory.

As has been mentioned, here and elsewhere, I've always been fond of Lacault and his circuitry, but I must confess to raising an

arched eye-brow when I came across an editorial he had written for RADIO NEWS, in June of 1922. He had entered the bread-baord vs. panel controversy. In a phrase, if we can call a full-page editorial a phrase, he was against panels. In response to an article by one E.E.Boucher in "Wireless Experimenters Manual", Lacault wrote:

> *"A panel or cabinet adds nothing to the electrical efficiency of the set, except that it is manipulated with less difficulty than the isolated instrument."*

The statement was frankly stupid, as every school-boy knows that panels do not add to a set's efficiency, save metal ones designed into the grounding circuit of the set, but that came later. Lacault used a very poor argument, and it bothered me, as while such blunders might have made him human, therefore fallible, and one does not like to learn that one's heroes are usually human. As mentioned previously, his attitude changed radically with his lovely "Ultradyne L-3".

Having constructed most of the "Ultradynes" from scratch, I can state in all candour that the circuitry is impressive, even by our so-called modern criteria. I would still have hopes of finding a working "Ultradyne L-3" before I pass beyond the Bourne.

* * *
* *
*

Sensitivity

-never before thought possible!

With the extreme acuteness of the bloodhound's scent, the Model L-2 Ultradyne detects the faintest broadcast signals—signals that are "dead" to other receivers—regenerates and makes them audible on the loud speaker.

It's here, where the development of other super-radio receivers has halted; the Ultradyne forges ahead.

The unusual sensitivity of the Model L-2 Ultradyne is due to the successful application of regeneration, to the famous Modulation System of radio reception, recently perfected by R. E. Lacault, E.E., A.M.I.R.E., Chief Engineer of this Company and formerly Radio Research Engineer with the French Signal Corps Research Laboratories.

It's this development, an exclusive feature of the Model L-2 Ultradyne, that makes it possible to receive greater distance on the loud speaker.

In addition the Ultradyne is the most selective receiver known. Regardless of close similarity in wavelength, it selects any station within range —brings in broadcasting clearly, distinctly, faithfully.

Everything that the Model L-2 Ultradyne means in actual results and genuine satisfaction, you will appreciate the first evening you operate it.

THE ULTRADYNE KIT
Consists of 1 Low Loss Tuning Coil, 1 Special Low Loss Coupler, 1 Type "A" Ultraformer, 3 Type "B" Ultraformers, 4 Matched Fixed Condensers.
To protect the public, Mr. Lacault's personal monogram seal (R. E. L.) is placed on all genuine Ultraformers. All Ultraformers are guaranteed so long as this seal remains unbroken. **$30.00**

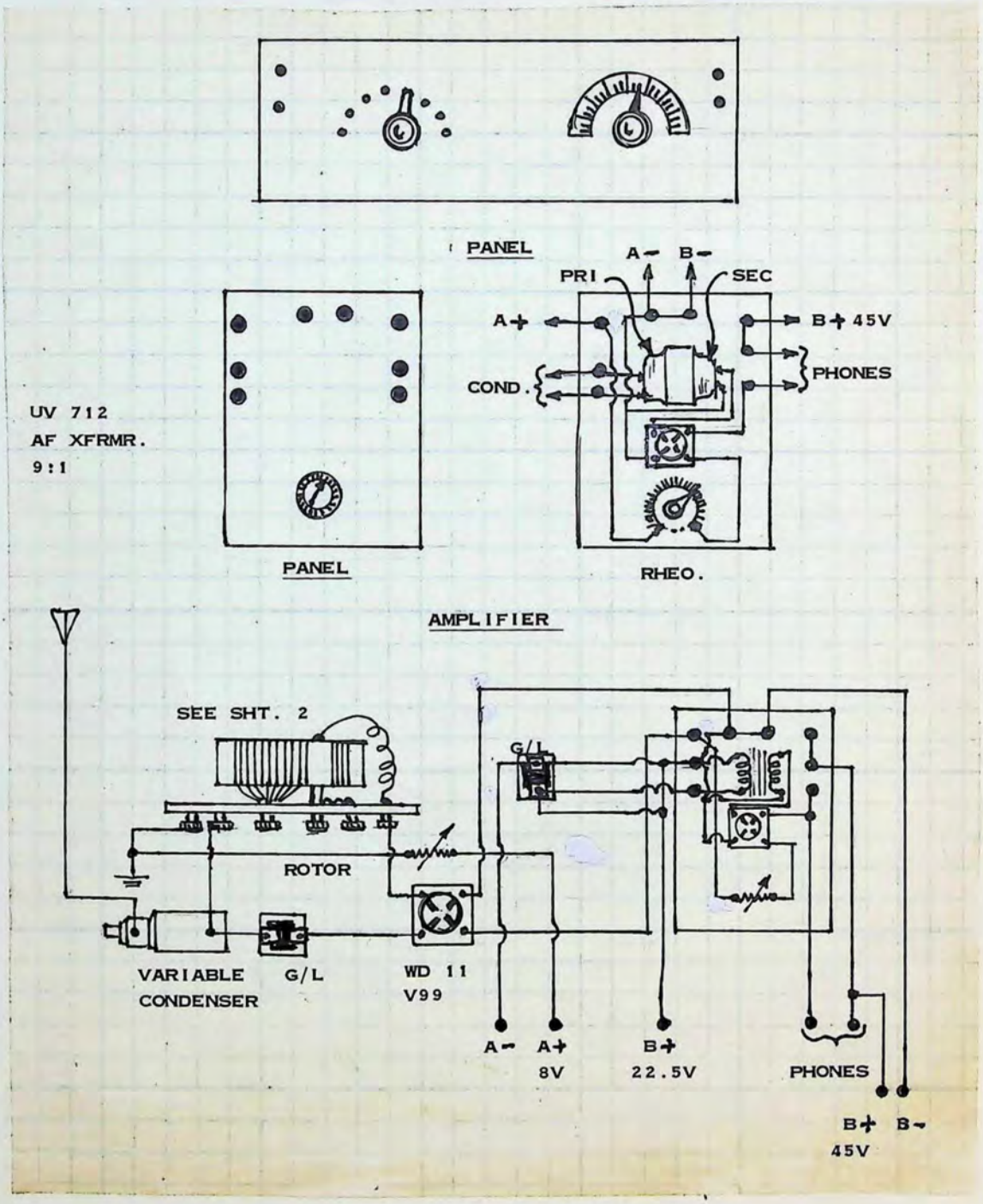
How to Build and Operate the ULTRADYNE
32 page illustrated book giving the latest authentic information on drilling, wiring, assembling and tuning the Model L-2 Ultradyne Receiver..... **50c**

Write for free descriptive folder.

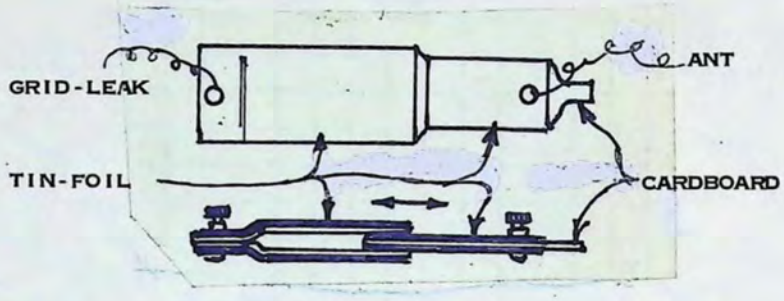
ULTRADYNE
MODEL L-2

PHENIX RADIO CORPORATION
3-C Beekman Street, New York

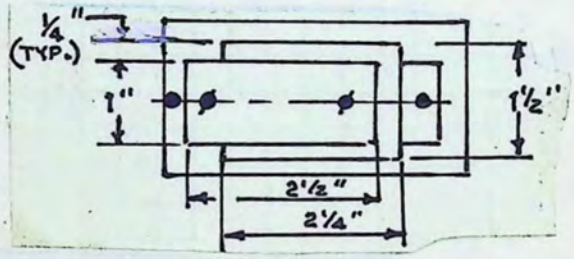
A LACAULT CIRCUIT FROM "RADIO NEWS", 1922

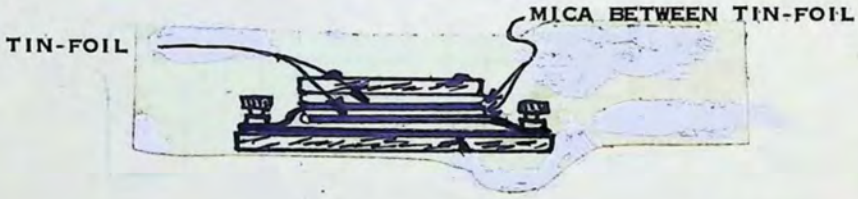


A LACAULT CIRCUIT FROM "RADIO NEWS", 1922; Sht. 2



VARIABLE CONDENSER





GRID-LEAK CONSTRUCTION

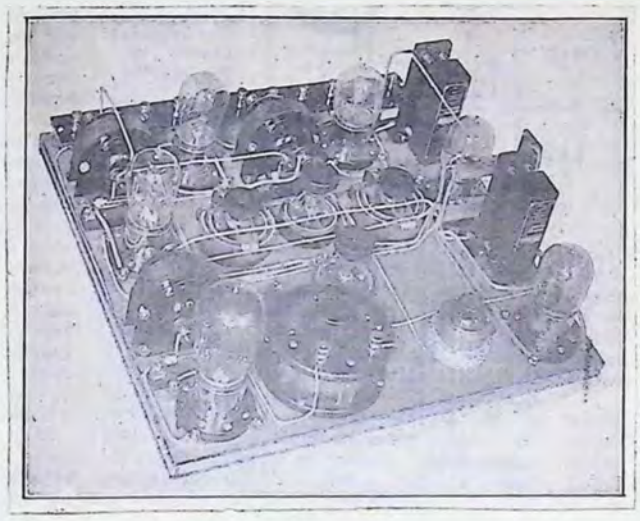
COIL DATA: Form = 3 ½" x 11¼".

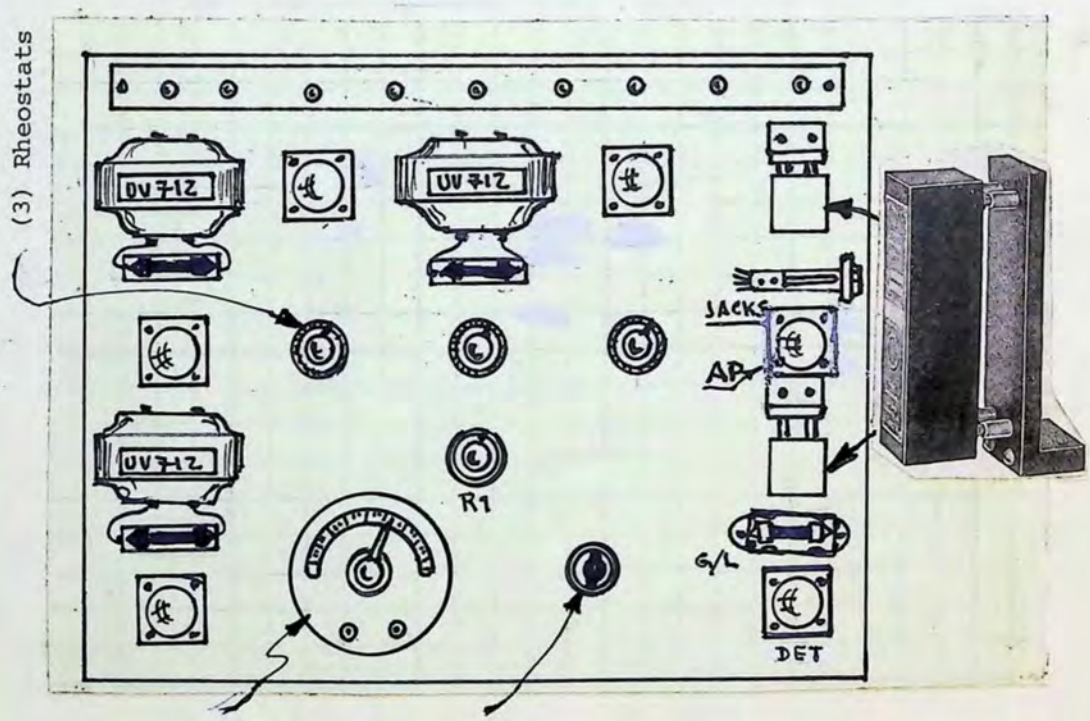
PRI = 1½" Long winding.
SEC = 8.375" Long, tapt every 15 turns.

Spacing between windings .75".

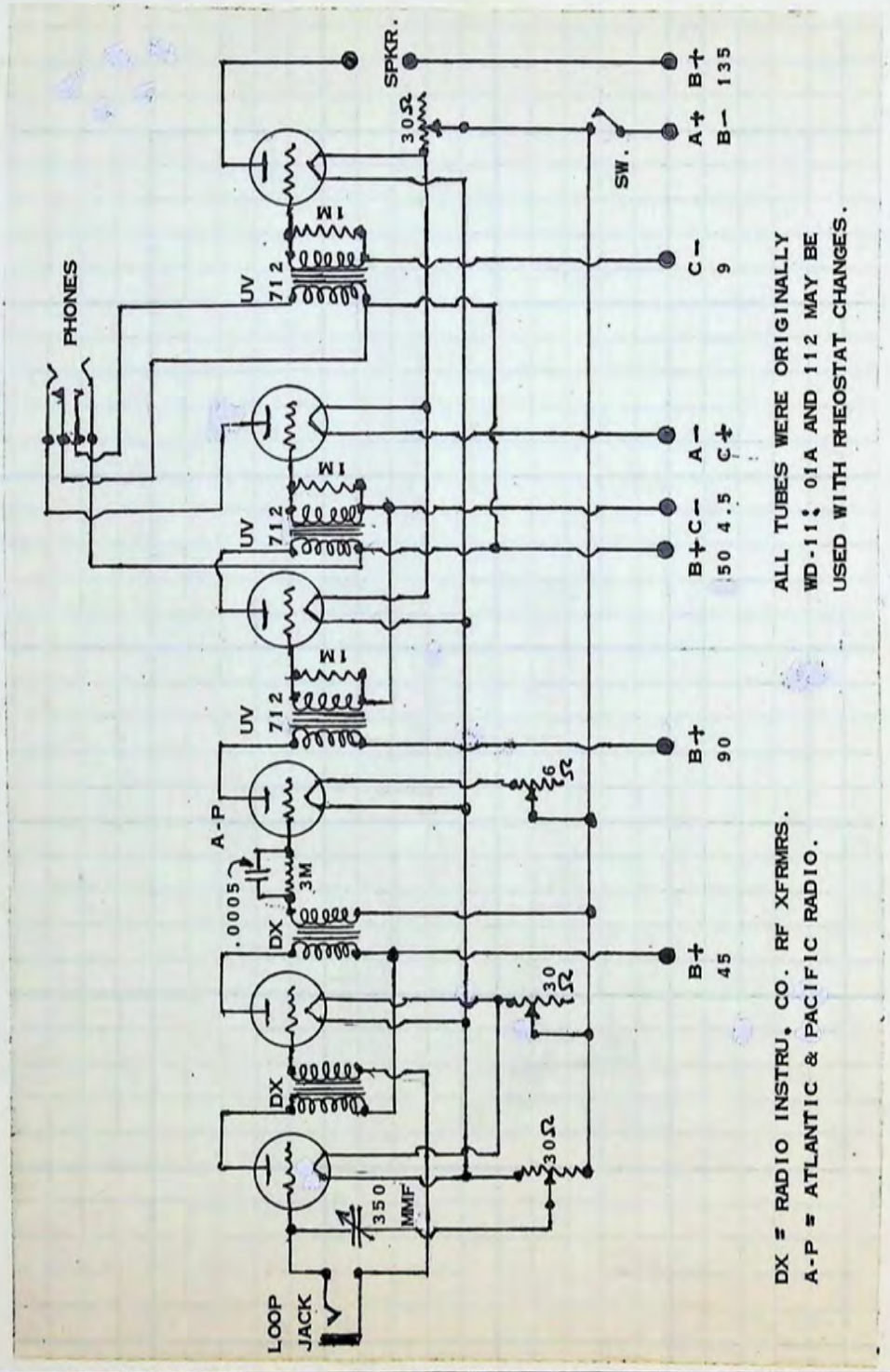
(Sht. 1)

LACAULT's "Radio Concerta", 1922



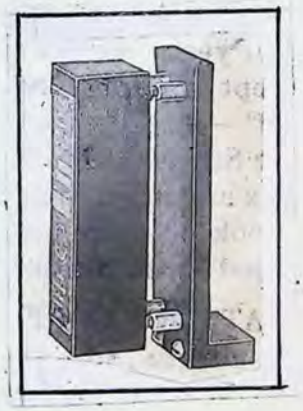


LACAULT's "RADIO CONCERTA", 1922: Sht. 2



(Sht. 3) LACAULTs "Radio Concerta", 1922

Two of the items shown on this page were used by Lacault in the designing of the *Radio Concerta*. The encased variable was a Chelsa 350mmf, of 23 plates. The encased type were used by only a few manufacturers as the open type were cheaper to make. Murdock seems to have been the most popular. The unit shown retailed in the $5 to $15 range.



The radio frequency transformer shown right was from the Radio Instrument Co., of Washington, D.C., and was short-lived. The unit was of the plug-in type, available in a set of three, with a BC coil seperate, requiring an adapter. The wavelength range was:

RIC-1	170 -	450	Meters
-2	400 -	1200	"
-3	900 -	3000	"

Aside from Lacault's use of the plug-in RF transformers, the only other application for that configurations seems to have been, as a logical extension, a DET-AMP combination, offered in a single cabinet by RIC in 1922. From my records, it would seem that only Haynes, one of the early pioneers who endured into the Thirties, was the only circuit designer to use it. His design is shown at left. Among Haynes' design contributions was a very reliable circuit for using the Multiple Valve - three tubes in a single envelope. You will find references to Haynes in other volumes of this work.

* * *
* *

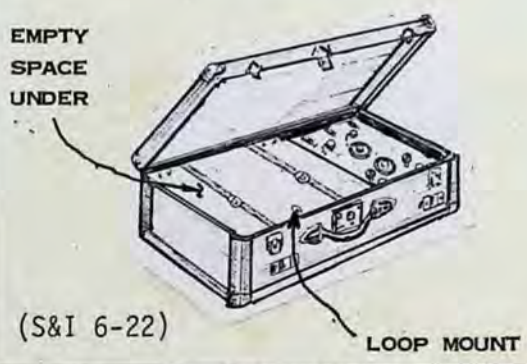
A Vacation-Time Radio

As Senior Editor for Gernsback, Lacault did contribute a few articles and schematic diagrams to the pages of a couple of Gernsback's media empire, chiefly of the me-too variety. The circuits were conventional for the times, using off-the-shelf components, and none were truly original.

The idea of a portable radio was beginning to catch-on, and a plethora of portable scematics began to appear in all media, reaching a zenith in 1928. The set depicted here was Lacault's first original circuit that came about because of his desire to a radio while on his vacations. Vacations, in those days, usually meant getting out into the country, preferably into an area with lakes and streams.

The circuit is interesting enough, and you might have a go at "bread-boarding" it, if you come by the parts specified. The RAC-3's are scarce, admittedly, and are actually more museum pieces than a practical requirement, but they do turn up; although the last one I was offered at a swap-meet had a price-tag of $60 - which I promptly rejected. The dealer knew nothing about the RAC series of tubes, but someone had told him it was a museum piece - ergo! - it was costly.

The set depicted here had a range of from 180 to 500 meters, with two stages of RF amplification, designated AF Xfrmr. on the diagram, simply because it had an iron core, and was so designated by Lacault. The potentiometer regulated the potential applied to the grids through the loop winding. The rheostat was not really needed, but it probably helped now and then. While the very elegant Pathé variometer is called for, any small variometer of the period may be used. Early French parts are rather scarce here. You will also find Lacault's original instructions for constructing a loop to go along with the set. It was of the collapsible type, and fitted into the empty space under the lid shown on the carrying case.



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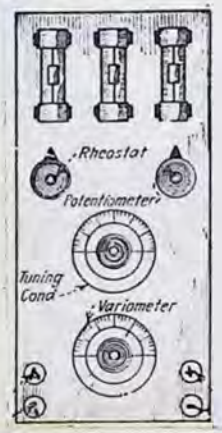
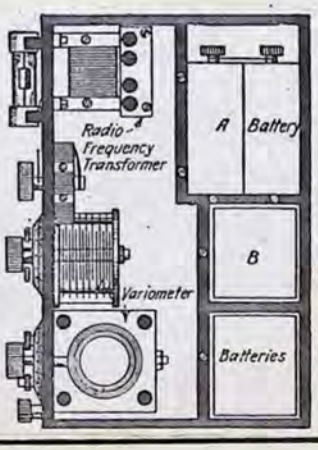
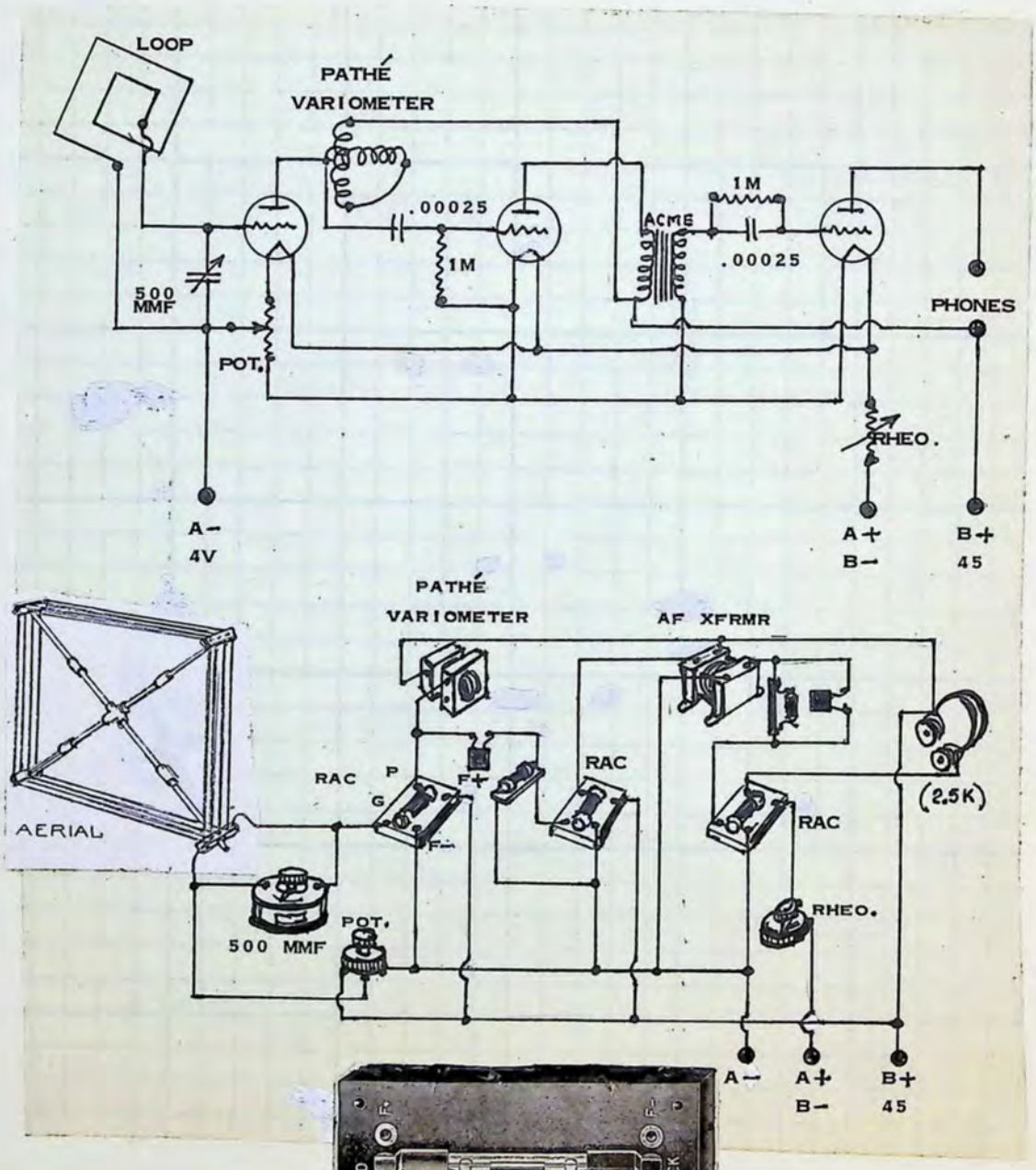


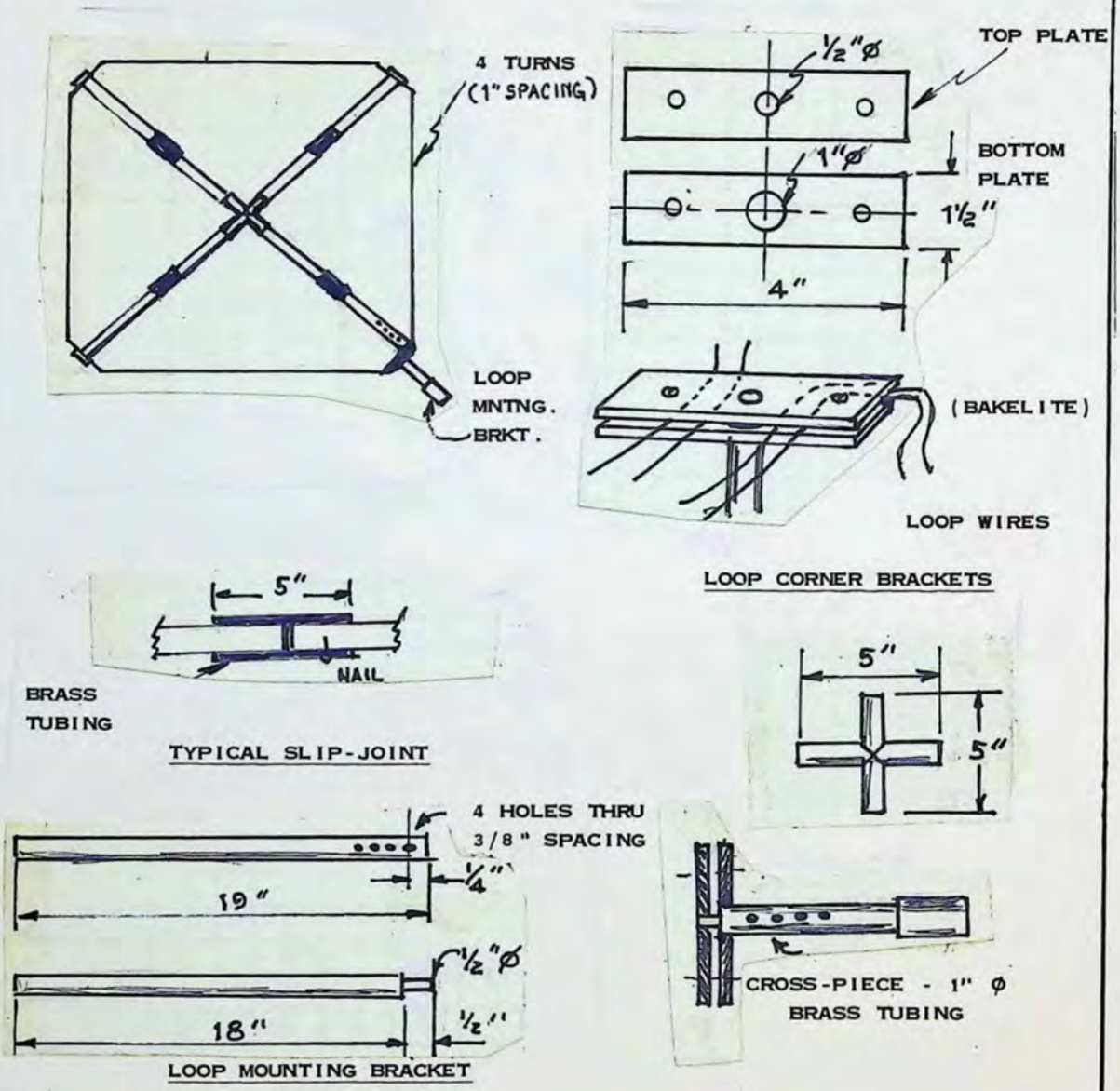


LACAULT's FIRST ORIGINAL CIRCUIT, 1922: Sht. 2



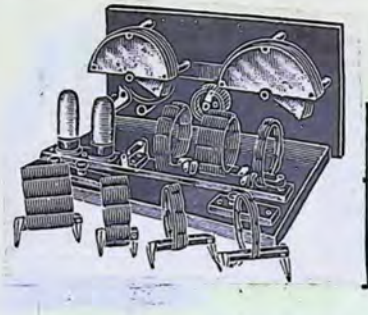
RAC-3 (½)

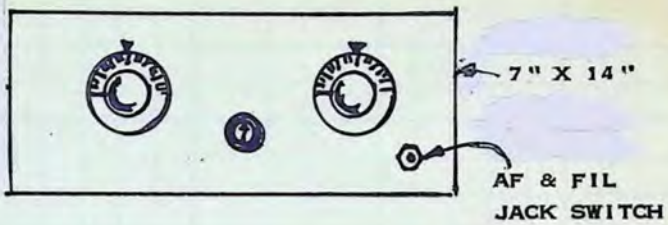
LACAULT's FIRST ORIGINAL CIRCUIT, 1922; Sht. 3

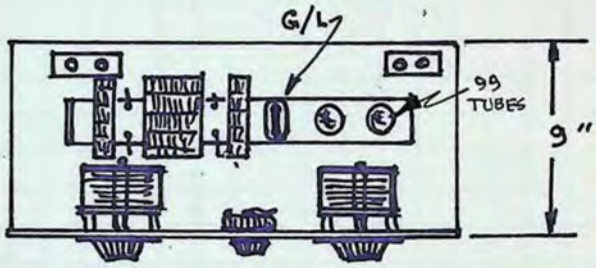


The loop consisted of 8 pieces of 1"ø wood rods: 4 were 18" long, provided with a 5" brass tube at each end. Three rods 18½", turned down to ½" on a lathe over a length of ½", through which were inserted adjusting nails to control the tension of the loop wire. The loop corner strips were capable of sliding up or down for tension. The receptacle for the loop was in the lid covering the empty space in the case.

LACAULT SHORT-WAVE RECEIVER, 1923







NOTES.

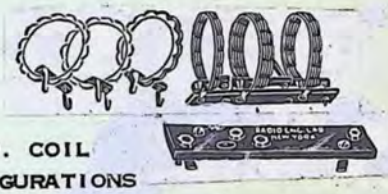
10 TO 200 METERS.

R.E.L. COIL SETS.(8)

R.E.L. VARIABLES.

1-STAGE AUDIO.

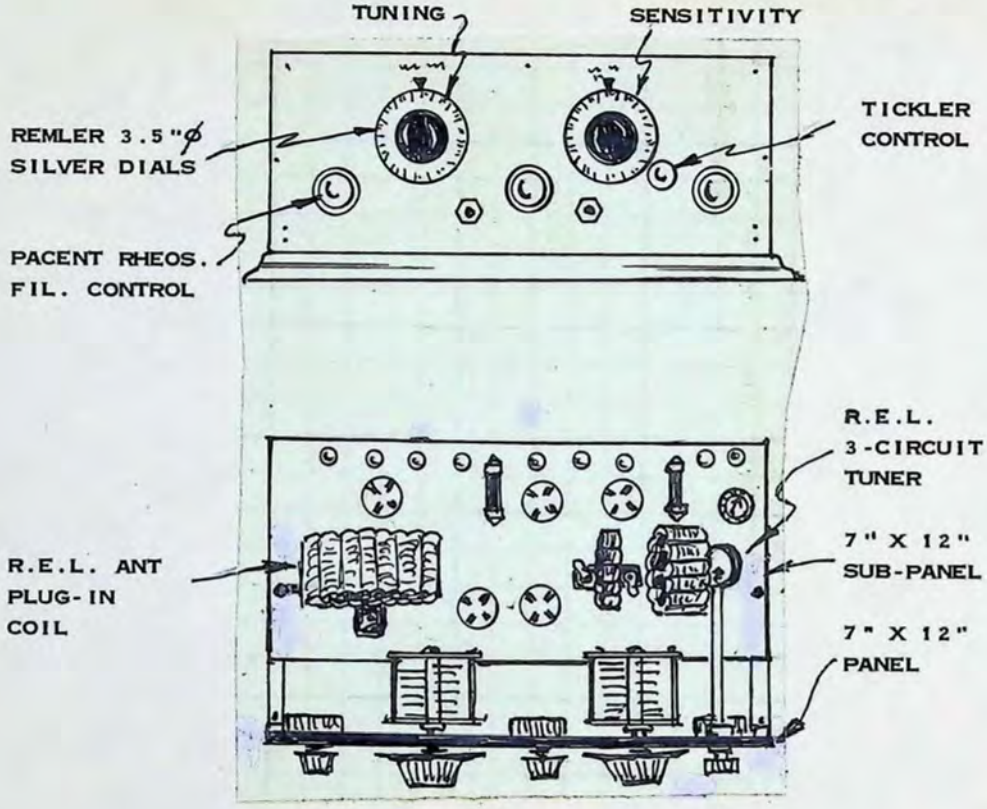
V99 TUBES.

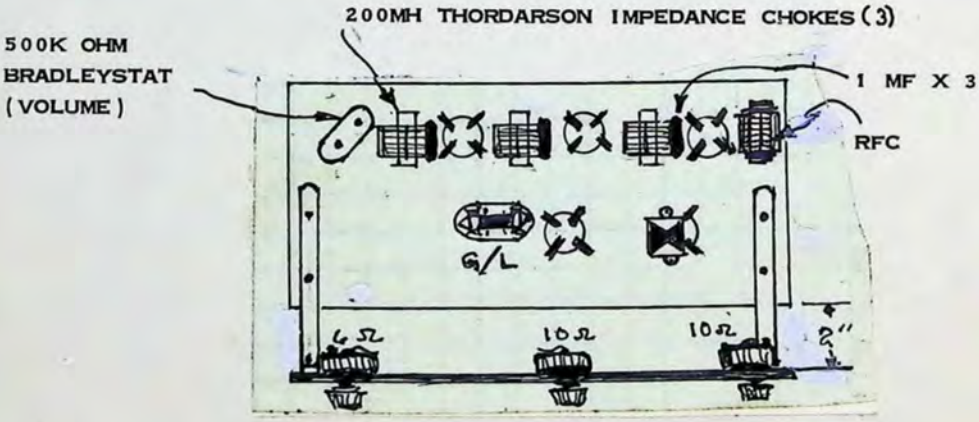


TYP. COIL
CONFIGURATIONS

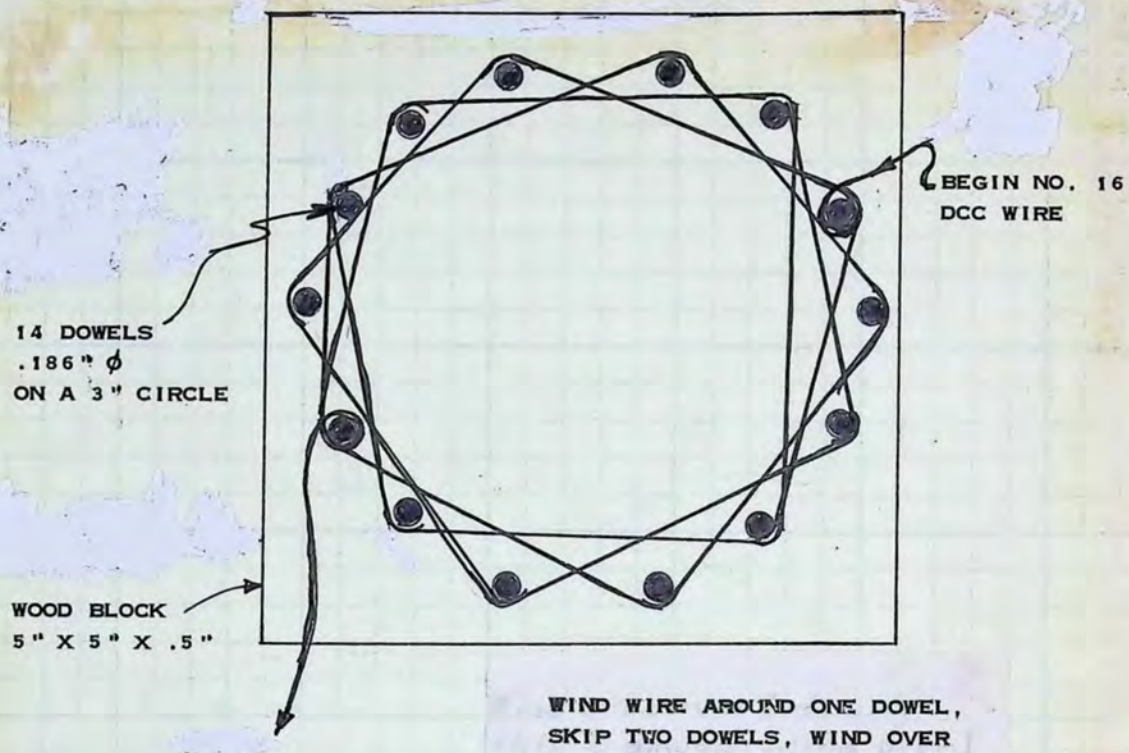
This was the first kit offered by Lacault after he had left Gernsback and set-up shop as Phenix Radio. It was offered to the home-constructor for $27.50, without the condensers. The layout is odd enough to be interesting, and if you have the R.E.L. coils, peculiar to this circuit, you will find a sense of satisfaction in constructing it. The kit did not endure for long, as Lacault had designed the *Ultradyne L-1*, and was busy promoting it.

AN ORIGINAL LACAULT "RADIO NEWS" CIRCUIT, 1923

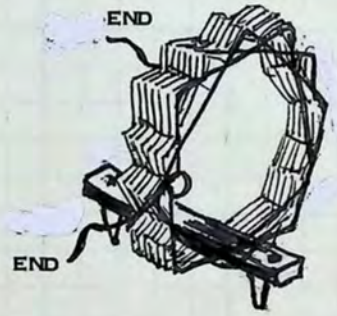


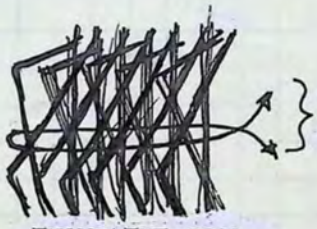


AN ORIGINAL LACAULT "RADIO NEWS" CIRCUIT, 1923 : Sht. 2



WIND WIRE AROUND ONE DOWEL, SKIP TWO DOWELS, WIND OVER ONE DOWEL, SKIP TWO DOWELS, ETC., ETC.





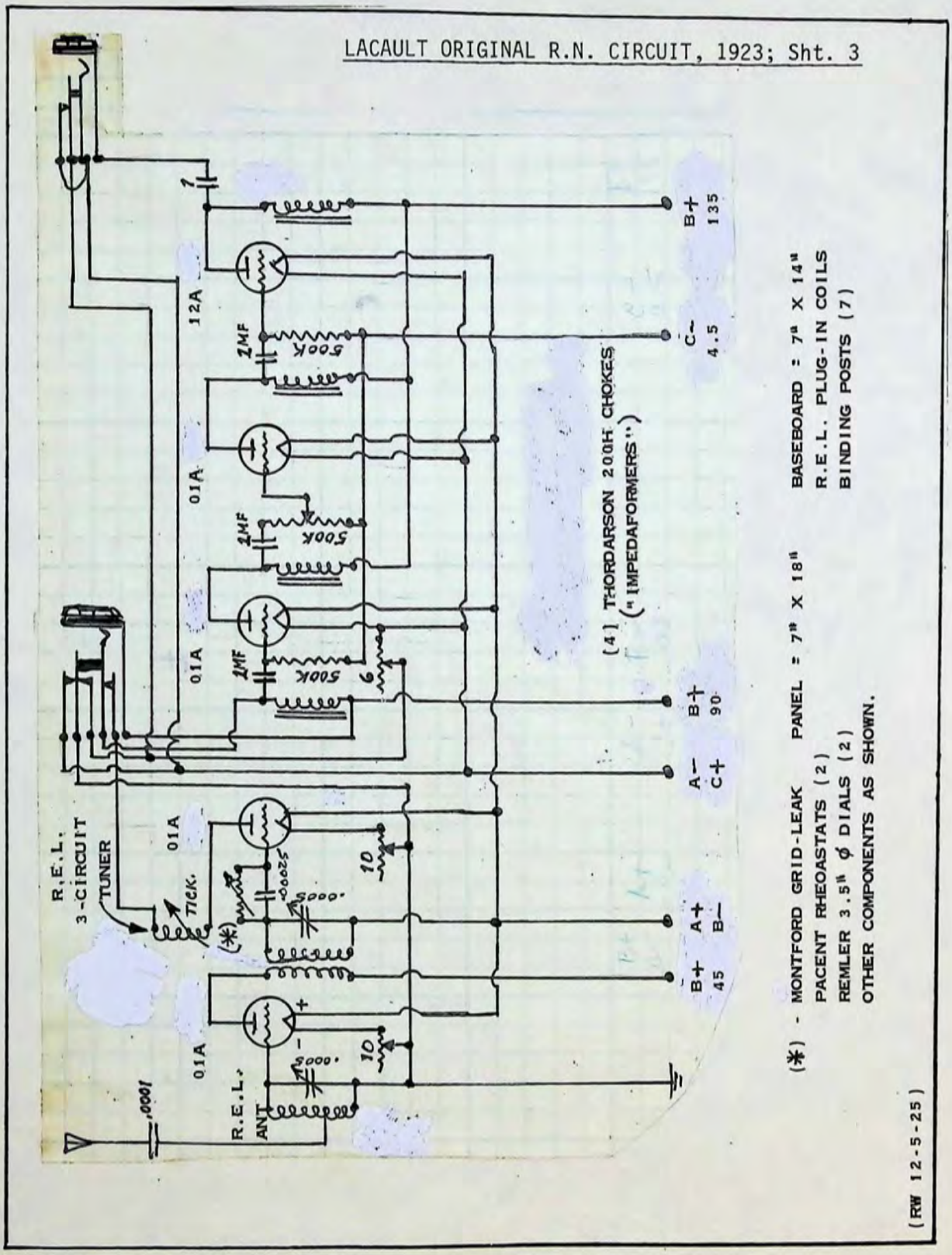
TYING THE COIL

R.E.L. COIL DATA

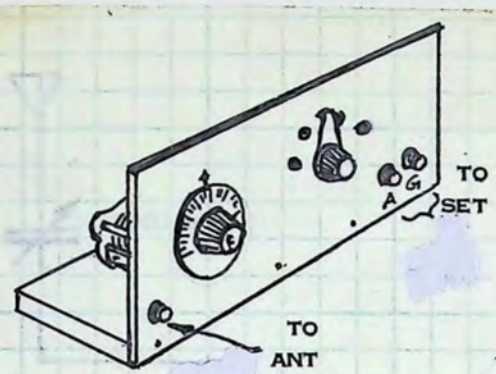
Tickler = 10T, #24 DCC, SW.
Bradley 500K rheostat.
500K fixed resistors (2).
R.E.L. Honeycomb Coils.

RFC = 100T, #22 DCC, 1"Ø form.
Variables = 500 MMF.
Tickler = 70T, #22 DCC, BC.
Single open jack.

Double closed jack.


LACAULT ORIGINAL R.N. CIRCUIT, 1923; Sht. 3
R.E.L. 3-CIRCUIT TUNER
TICK.
R.E.L. ANT
01A
12A
.0001
.0005
.0025
10
1MF
500K
6
(4) THORDARSON 200H CHOKES ("IMPEDAFORMERS")
B+ 135
C- 4.5
B+ 90
A- C+
A+ B-
B+ 45
(*) - MONTFORD GRID-LEAK
PACENT RHEOASTATS (2)
REMLER 3.5" ϕ DIALS (2)
OTHER COMPONENTS AS SHOWN.
PANEL = 7" X 18"
BASEBOARD = 7" X 14"
R.E.L. PLUG-IN COILS
BINDING POSTS (7)
(RW 12-5-25)

LACAULT AERIAL BOOSTER, 1922

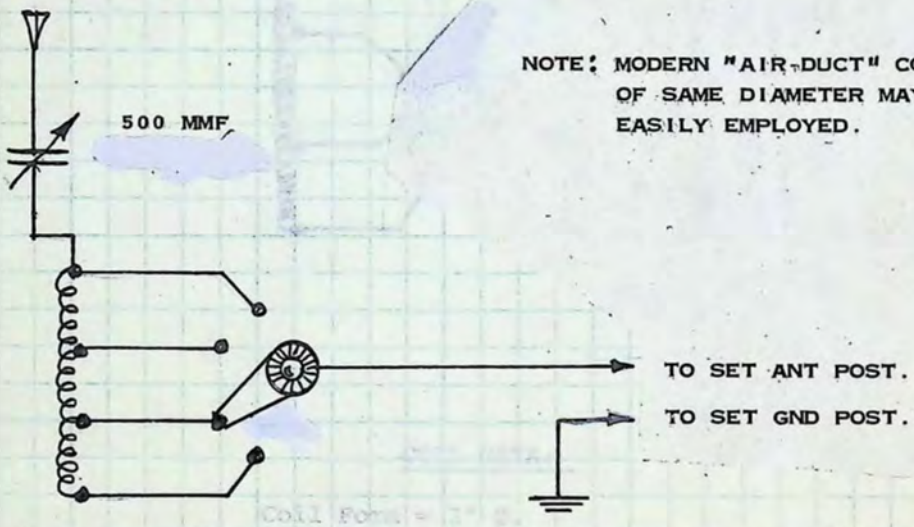


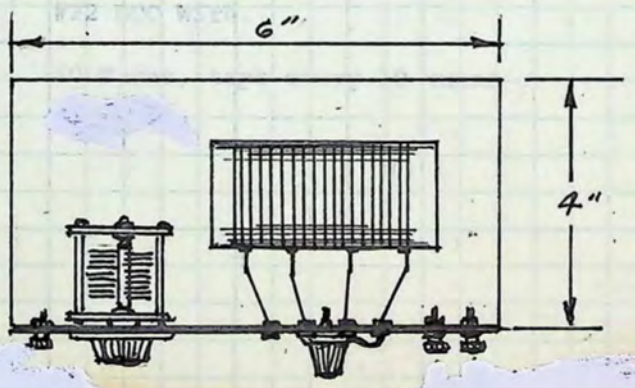
COIL DATA

COIL FORM 3" ϕ.

40 TURNS NO. 22 DCC WIRE, TAPT EVERY 10 TURNS

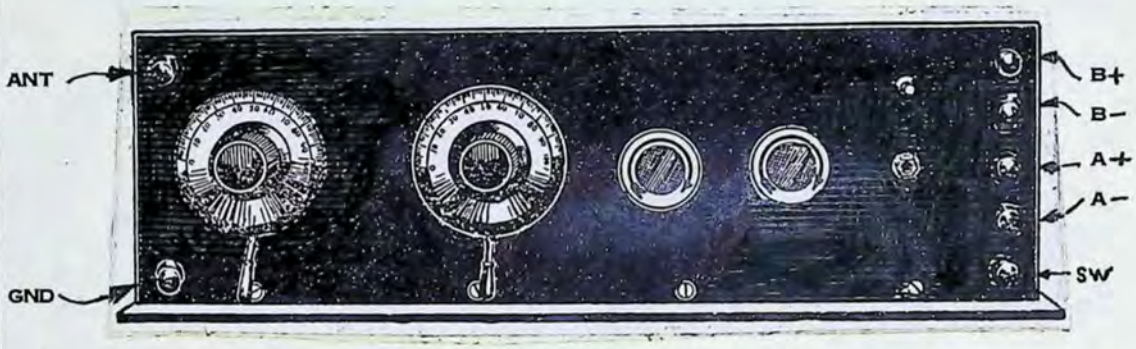
NOTE: MODERN "AIR-DUCT" COIL OF SAME DIAMETER MAY BE EASILY EMPLOYED.

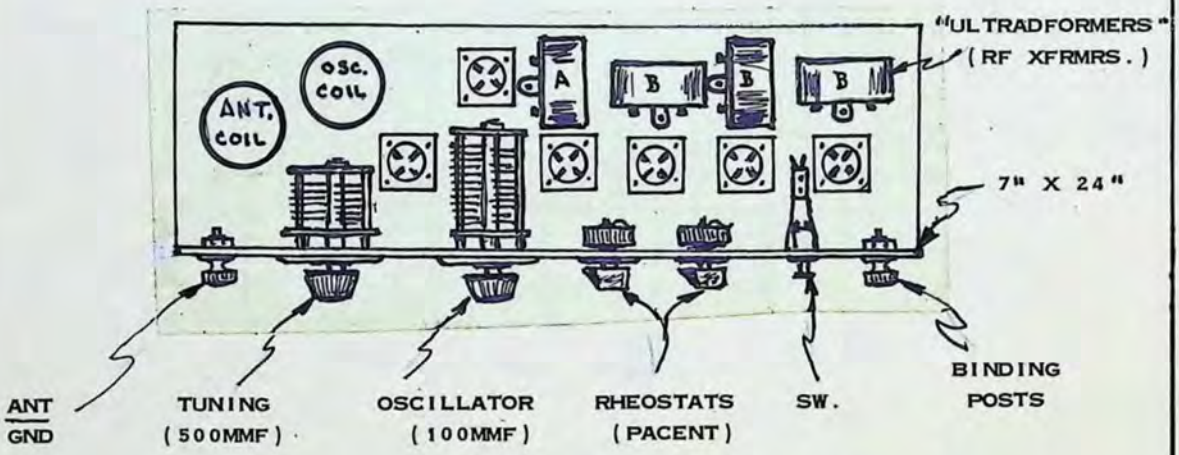




The Ultradyne Receiver

By ROBERT E. LACAULT, A.M.I.R.E.



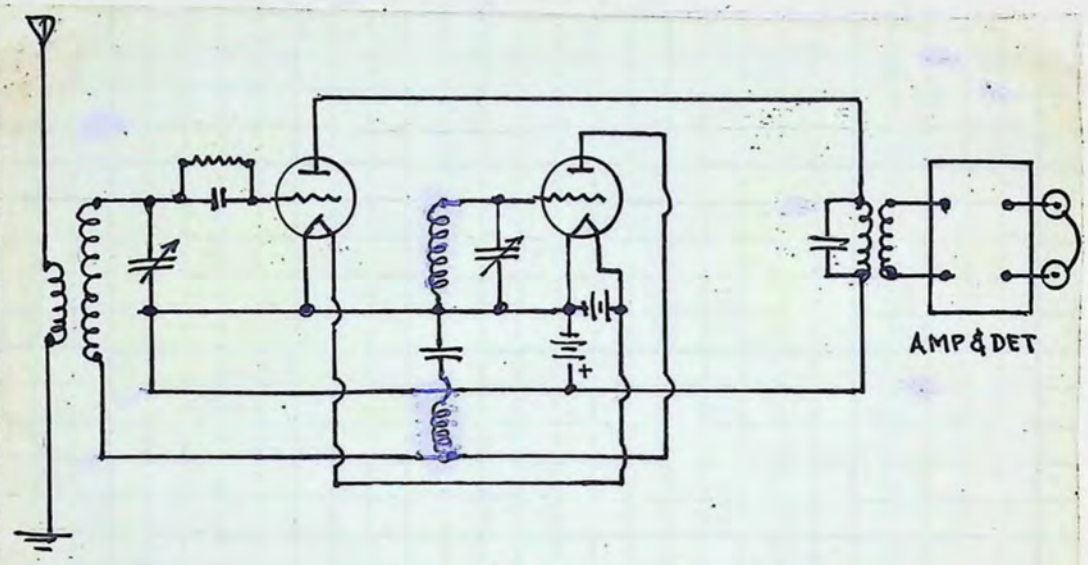


This is the original 6-tube version of the ULTRADYNE L-1, which was sensitive enough and powerful enough to pull-in stations a 1,000 miles away with volume to fill a room, and on a loop at that. Needless to say, the ULTRADYNE L-1 received a lot of excitable editorial attention at the time.

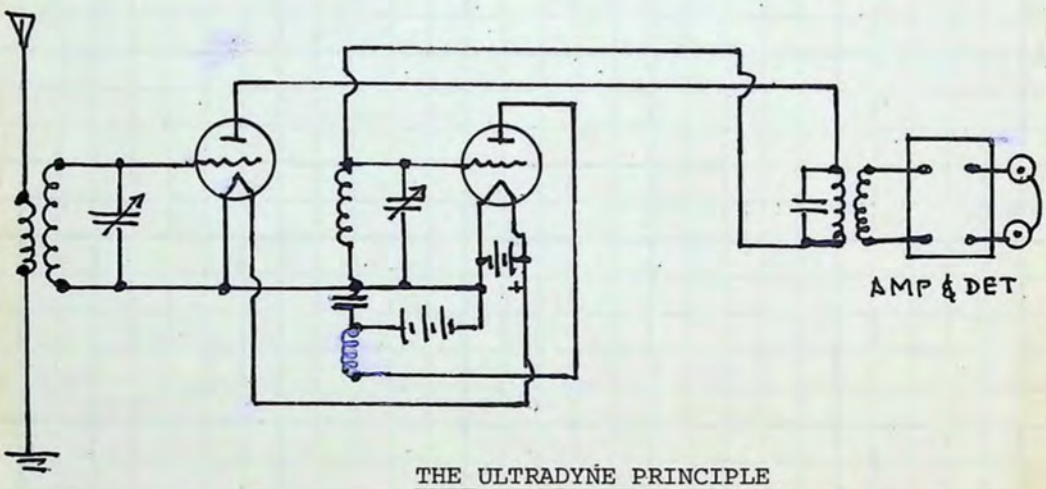
There was no audio amplifier, nor was one needed, but because our home-constructors were fixed in their belief that an AF amplifier should be included, Lacault designed one a year later. It could be connected to the L-1, but was made integral with the circuit of the ULTRADYNE L-2.

(RNSHB -24)

LACAULT's "ULTRADYNE" PRINCIPLE SIMPLIFIED

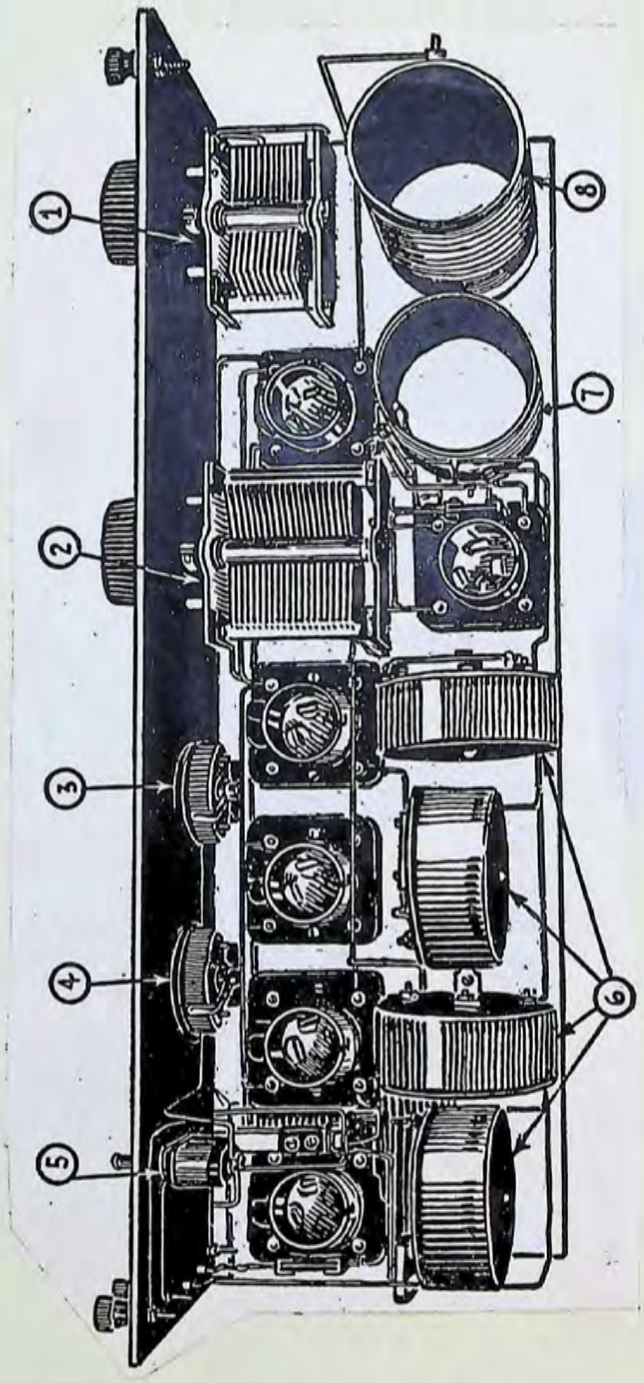


STANDARD SUPER-HETERODYNE

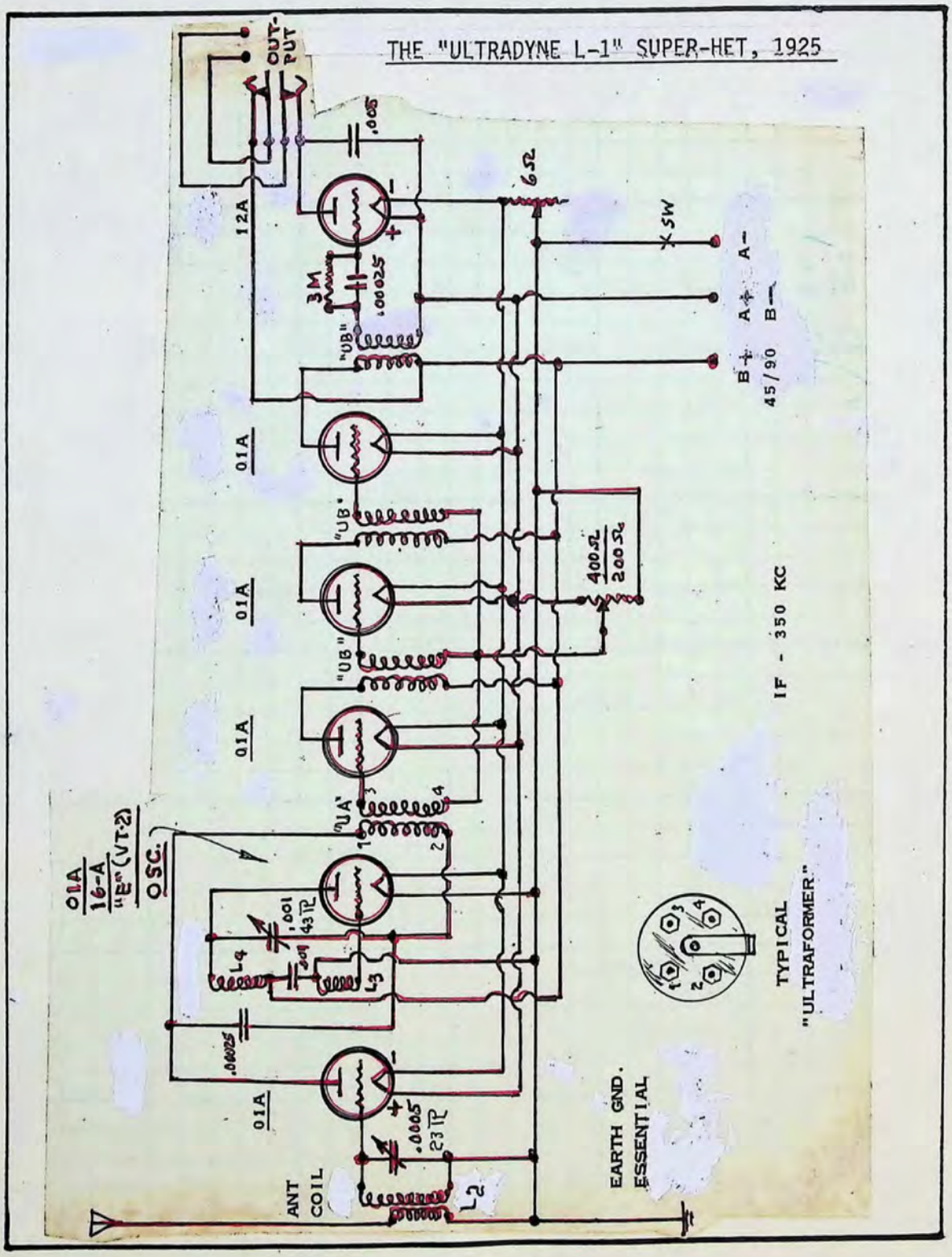


THE ULTRADYNE PRINCIPLE

THE "ULTRADYNE L-1" SUPER-HET, 1924

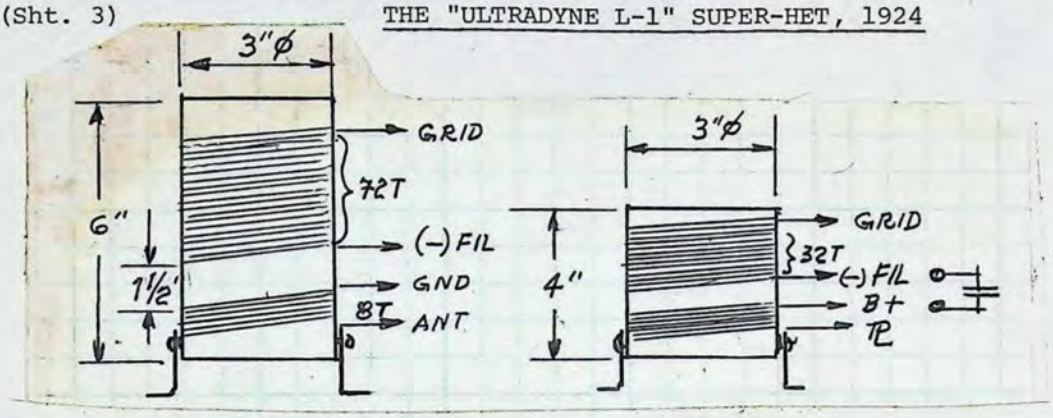


1. *Tuning Condenser*
5. *Switch*
2. *Oscillator Condenser*
6. *RF Transformer*
3. *Potentiometer*
7. *Oscillator Coil*
4. *Rheostat*
8. *Tuning Coils*


THE "ULTRADYNE L-1" SUPER-HET, 1925
OUT-PUT
.005
12A
3M
.00025
"UB"
6Ω
SW
A+ A-
B+ B-
45/90
01A
"UB"
400Ω
200Ω
IF - 350 KC
01A
"UB"
01A
"UA"
01A
16-A
"E" (VT-2)
OSC.
.001
43TP
L4
L3
.00025
01A
.0005
23TP
ANT COIL
L2
EARTH GND. ESSENTIAL
TYPICAL "ULTRAFORMER"

(Sht. 3)

THE "ULTRADYNE L-1" SUPER-HET, 1924

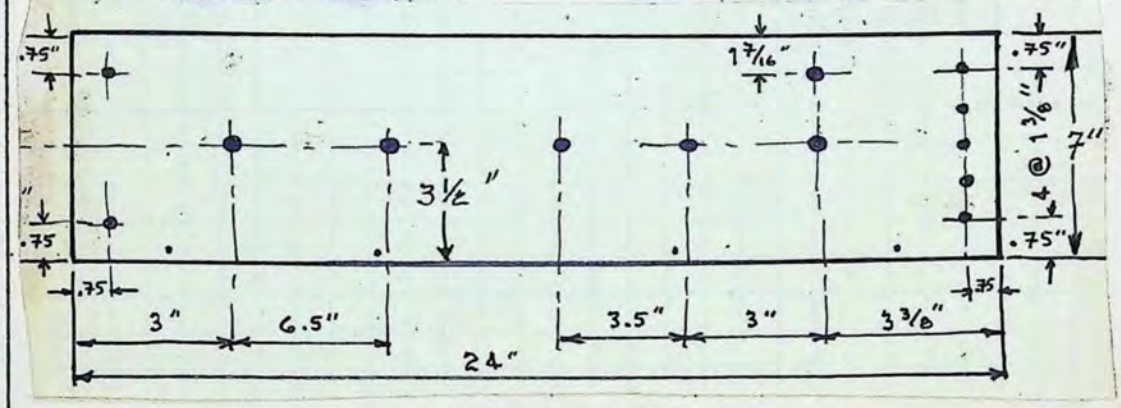


ANT COIL

NO. 20 DCC WIRE
PRI & SEC WOUND IN THE SAME DIRECTION.
PRI - 8 TURNS
SEC - 72 TURNS

OSC COIL

NO. 20 DCC WIRE
PRI - 24 TURNS
SEC - 32 TURNS



PANEL HOLE PATTERN

COIL DATA

L1 = 10T, #22 DCC
L2 = 45T, " "
L3 = 20T, " "
L4 = 30T, " " (may be wound on 2" Ø form)
L5 = 55T/43T, #24 DCC
L6 = 45T/35T, " "

Lacault's "ULTRAFORMERS" = wound with 550T of #30 DCC wire, spaced at ¼". PRI was on a ¼" Ø dowel; SEC was .125" Ø.

"ULTRADYNE L-1" ADDENDUM

About five months after the "Ultradyne L-1" was released to the home-constructor, Lacault wrote an article as further improvements, and stated that he had received letters from constructors who were having trouble with their reception. The following notes are a condensation of Lacault's comments.

Fixed capacitors were notorious for their inaccurate markings. Lacault tested all of the then-available mica capacitors and found that despite the fact that they were all stamped .00025 MF, he was getting readings of from .0002 to .00052 MF. He used a standard capacity bridge.

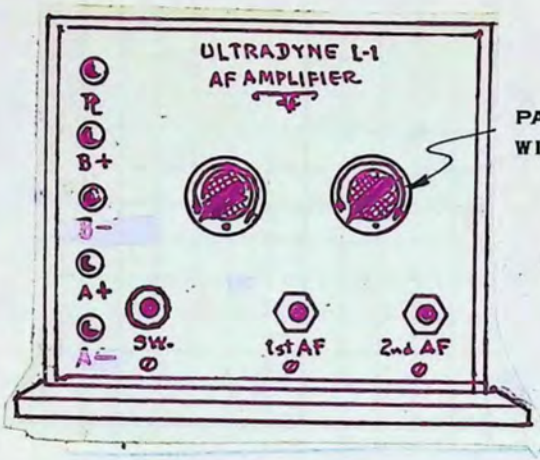
It was critical for the proper operation of the "Ultradyne L-1" to use the correct capacitor across the first RF transformer. If you are uncertain as to the value of the capacitor you are using, try inserting a midget variable condenser across the primary of RF-1. Once the proper setting has been found - determined by the quality of reception - you can leave the midget variable in the circuit, or replace it with a fixed capacitor matching the value determined by the midget variable condenser.

In the "Ultradyne L-2" this problem was obviated, as can be seen from examining the schematic.

Another suggestion by Lacault was to put a tapt inductance in the aerial before it went to the set. A sketch of Lacault's so-called "aerial booster" is shown on page 19. I have constructed this aerial booster, and there is an improvement in reception of certain wave-lengths, particularly around 500 meters.

* * *
* *
*

ULTRADYNE L1 AUDIO AMPLIFIER



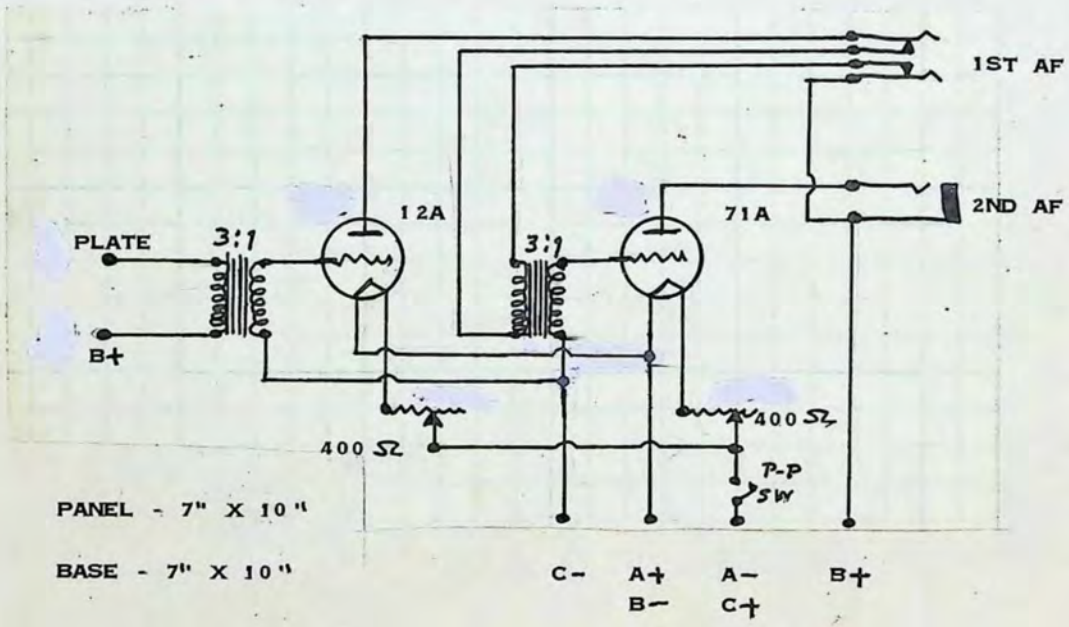
PACENT RHEOSTATS
WITH PACENT DIALS (2)

NOTE

1924 PANEL SHOWN.

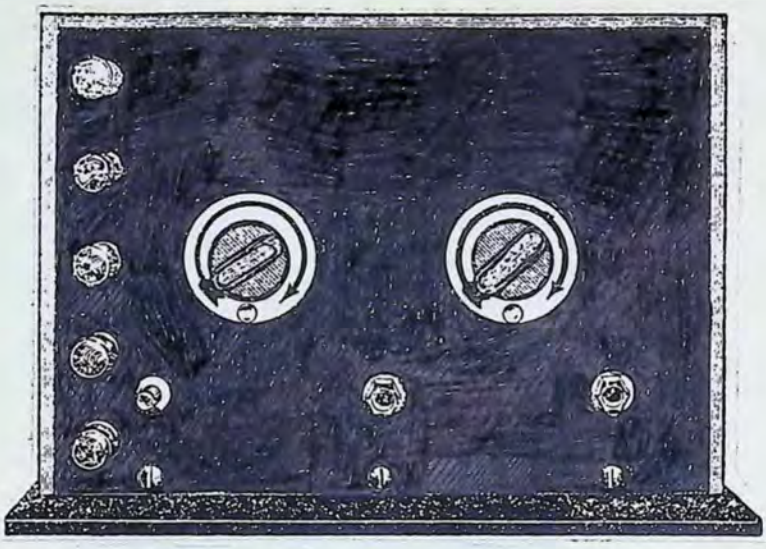
CAUTION:

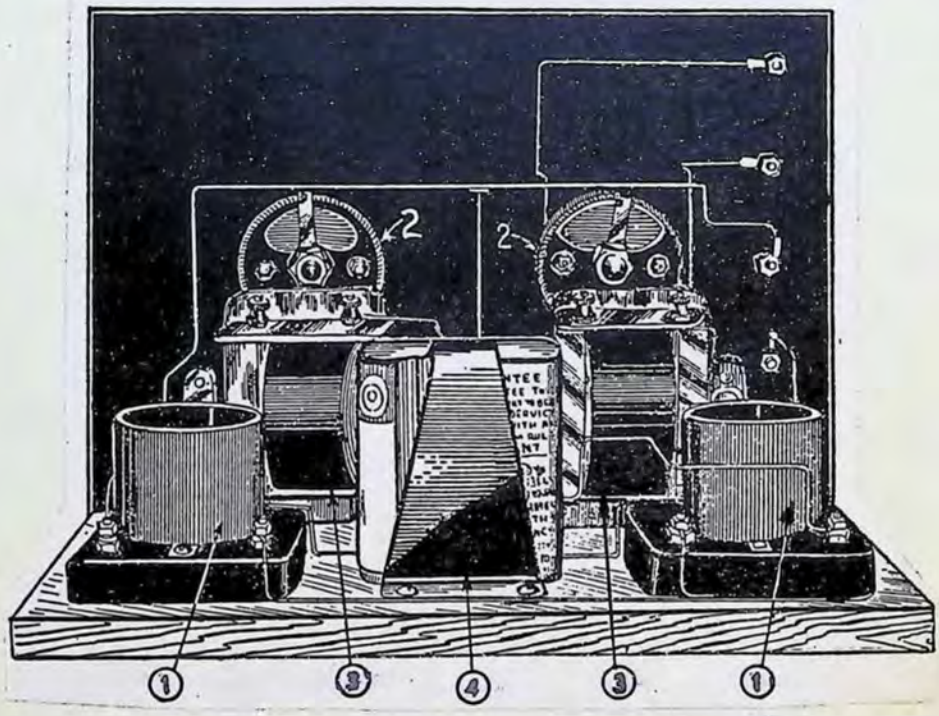
Remove the bare #16 copper wire (GND) from the receiver before connecting the audio amplifier.



1924 VERSION

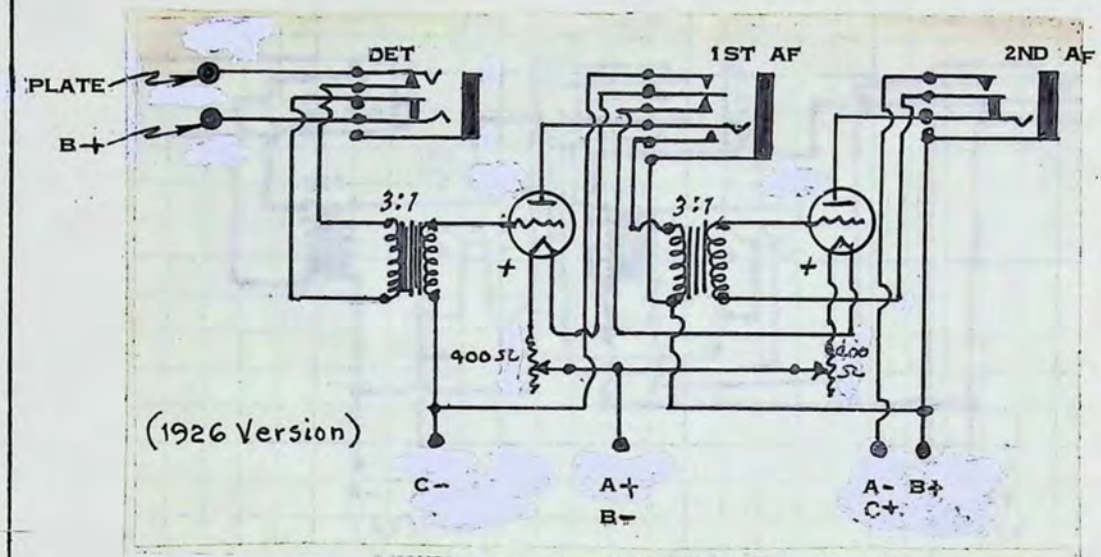
ULTRADYNE L1 AUDIO AMPLIFIER.





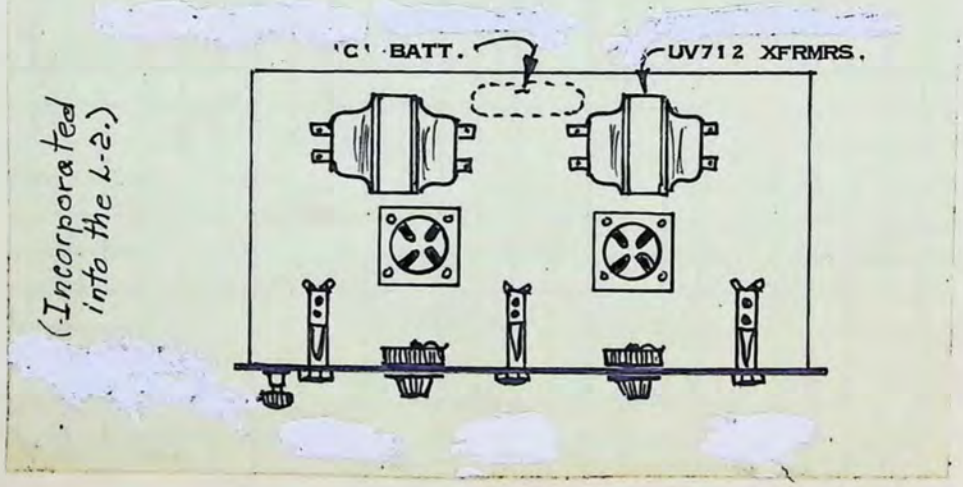
1. Tube Sockets
2. Rheostats
3. Audio Transformers
4. "C"-Battery

THE "ULTRADYNE L-1" AMPLIFIER, 1924/1926

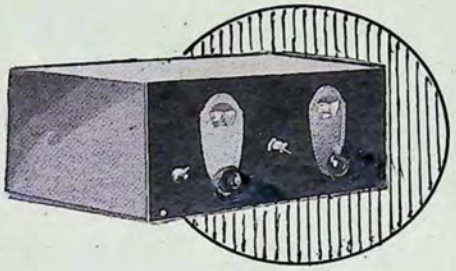


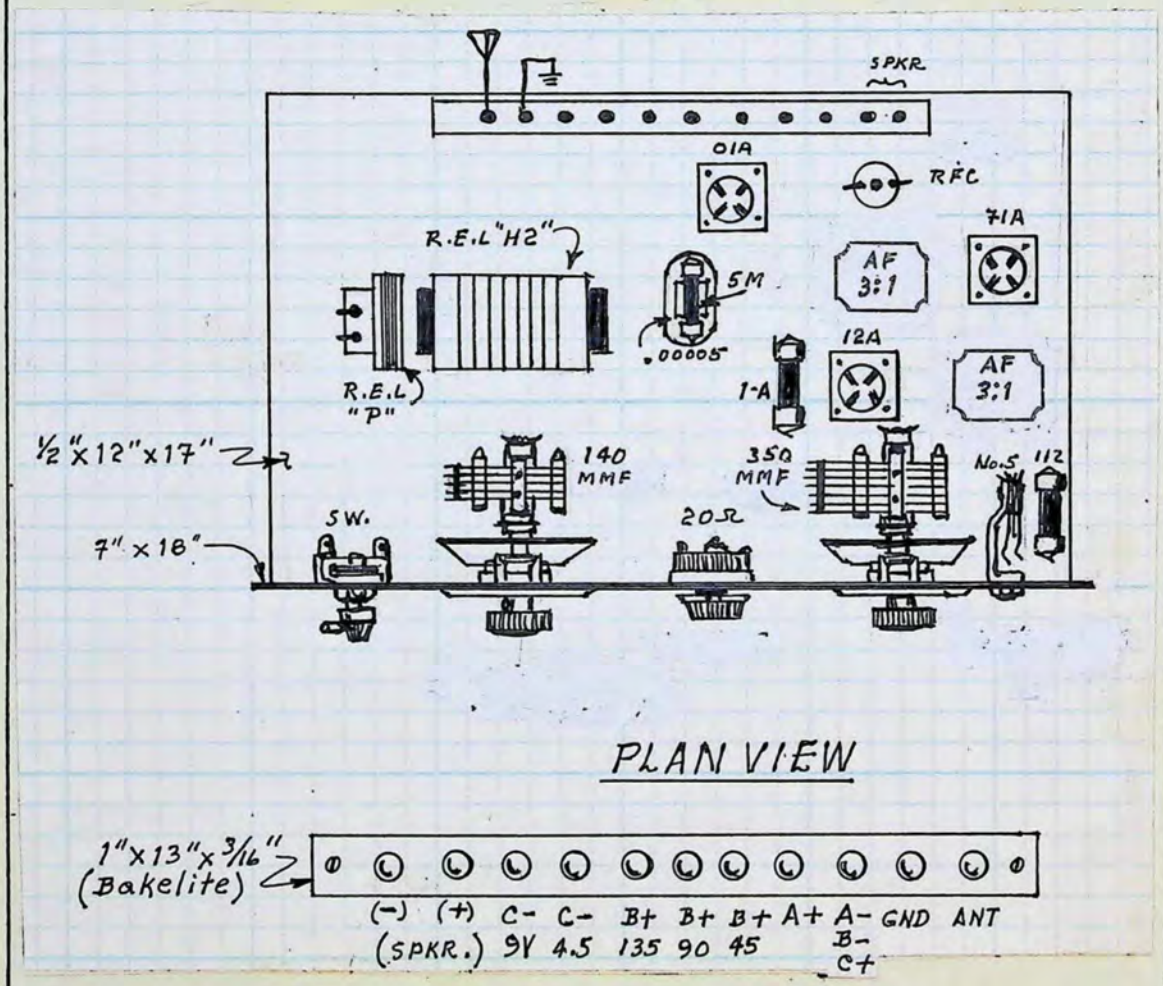
NOTES:

1. No. 14 hard-drawn tinned copper wire for hook-up.
2. (3) jacks, as shown.
3. (2) UX sockets.
4. (2) Pacent 400-ohm rheostats.
5. (2) RCA/GE UV-712 AF transformers.
6. (6) EBY engraved binding posts.
7. Panel = 8.5" x 11" x 3/16".



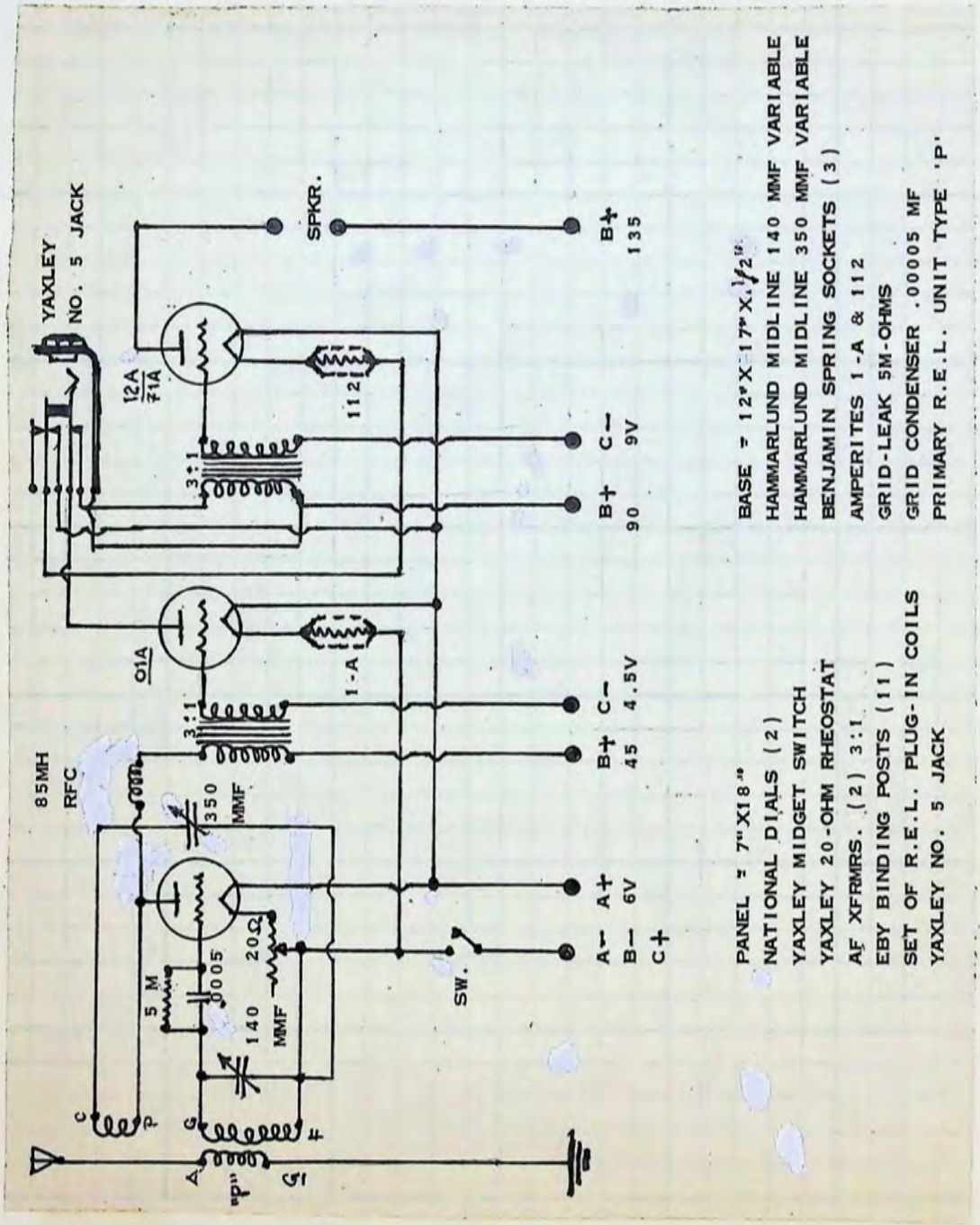
LACAULT SHORT-WAVE RECEIVER, 1926



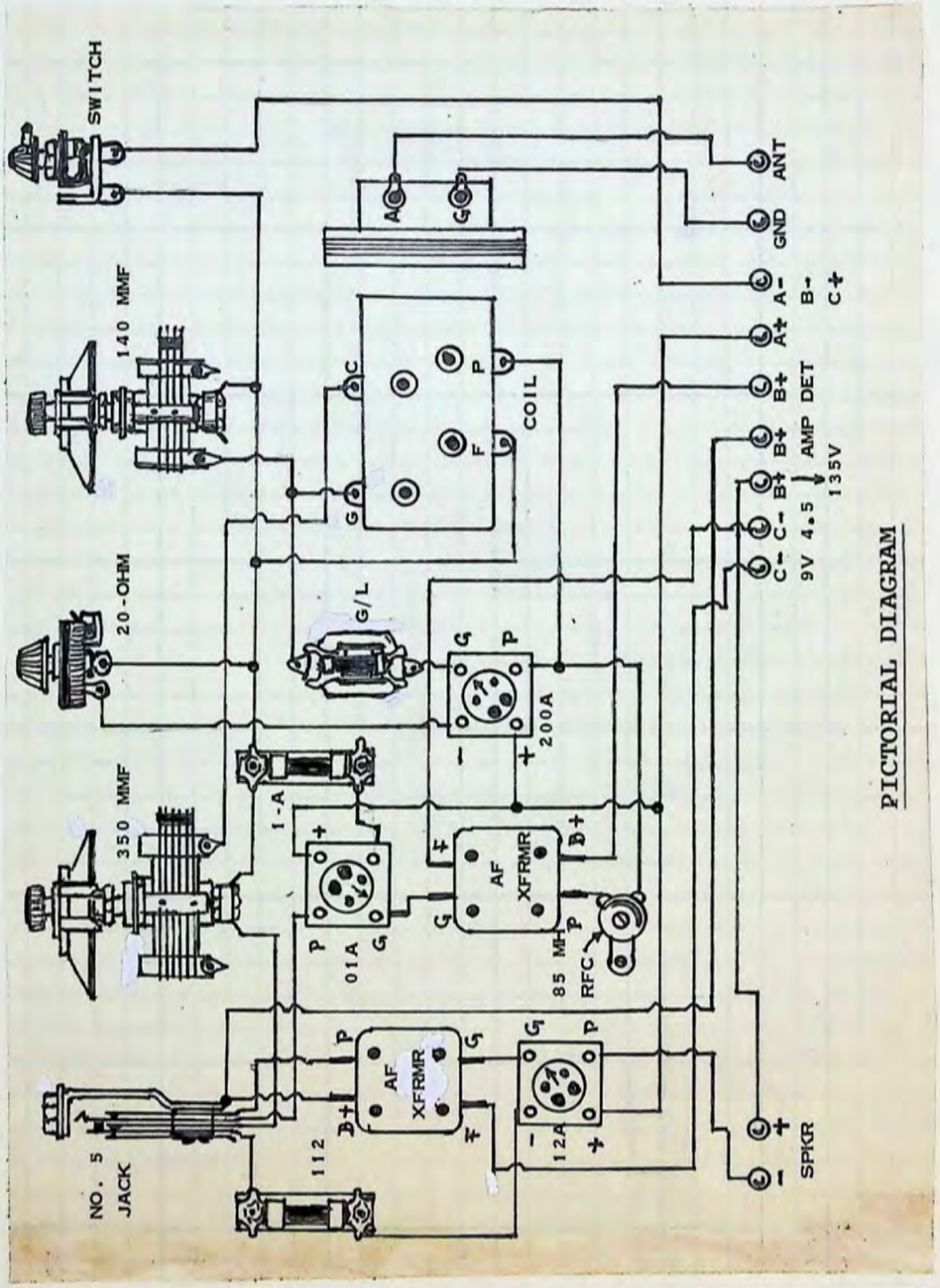


(CB III-2)

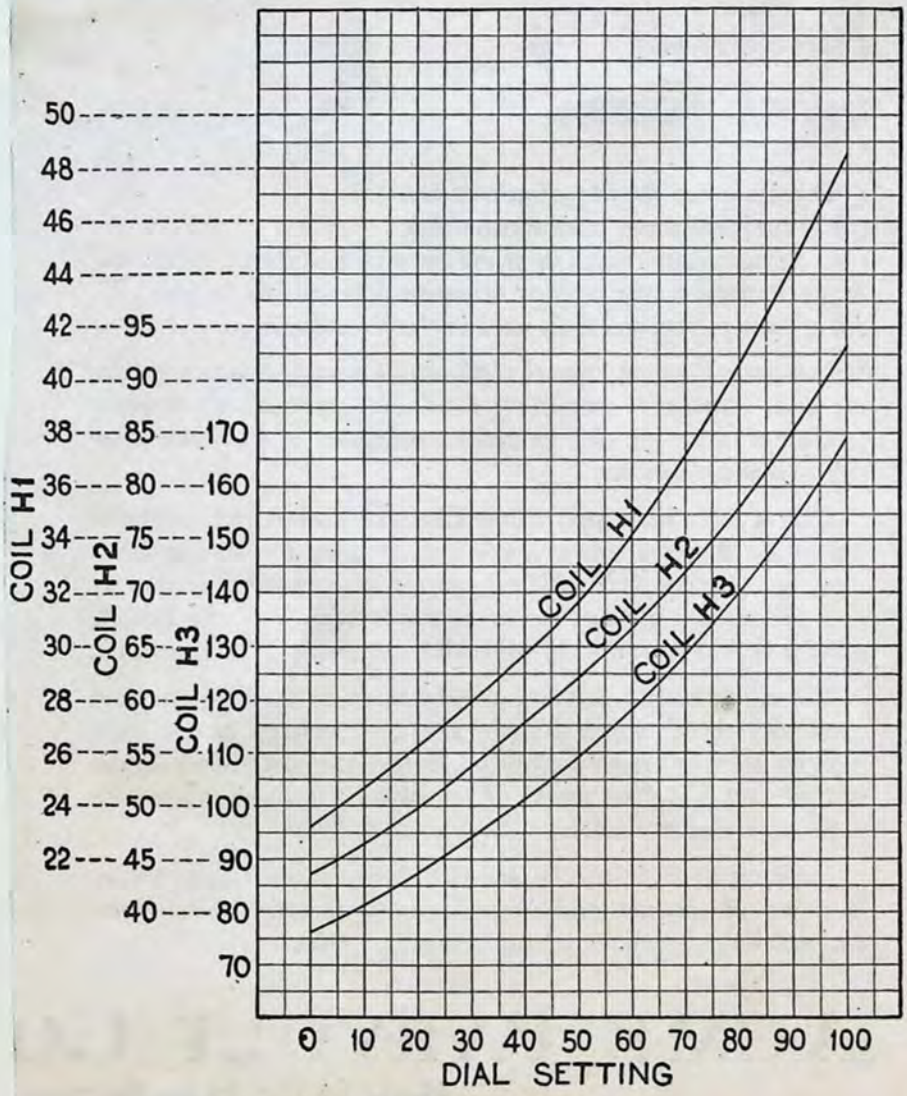
LACAULT SHORT-WAVE RECEIVER, 1926



LACAULT SHORT-WAVE RECEIVER, 1926

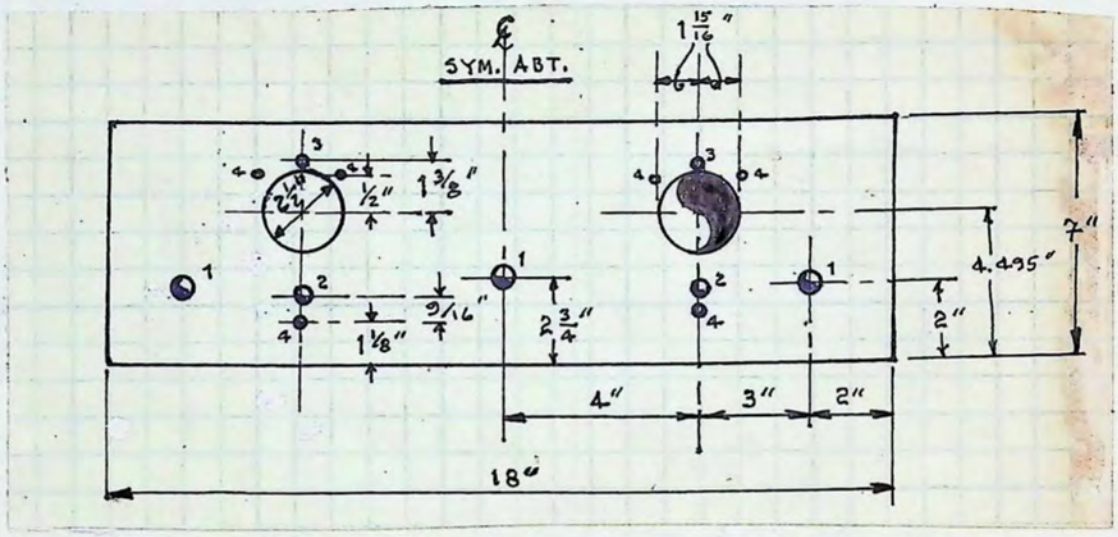


LACAULT's SHORT-WAVE RECEIVER, 1926



Short wave calibration chart for Lacault's set.

LACAULT's SHORT-WAVE RECEIVER, 1926

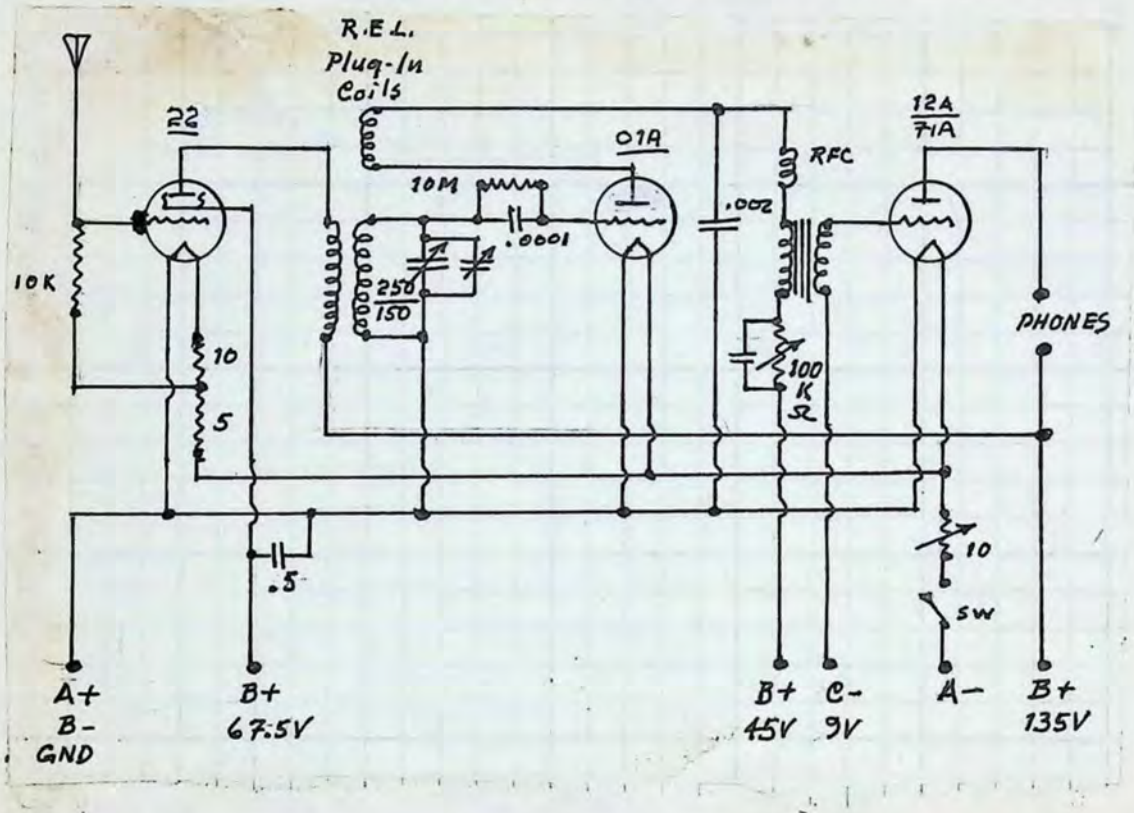


PANEL HOLE PATTERN

Hole Diameters:

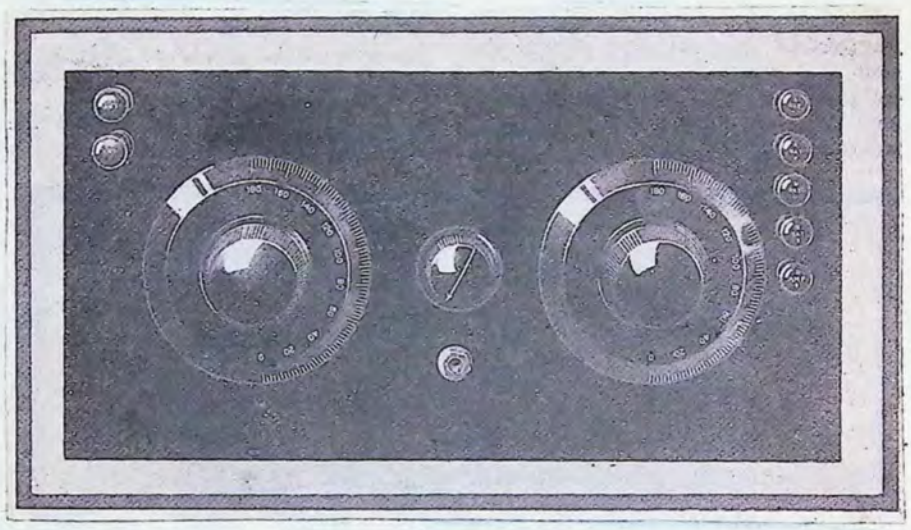
1. 7/16"
2. 3/8"
3. 5/32" csk.
4. 1/8"

LACAULT MODEL 231 SW. RECEIVER, 1927

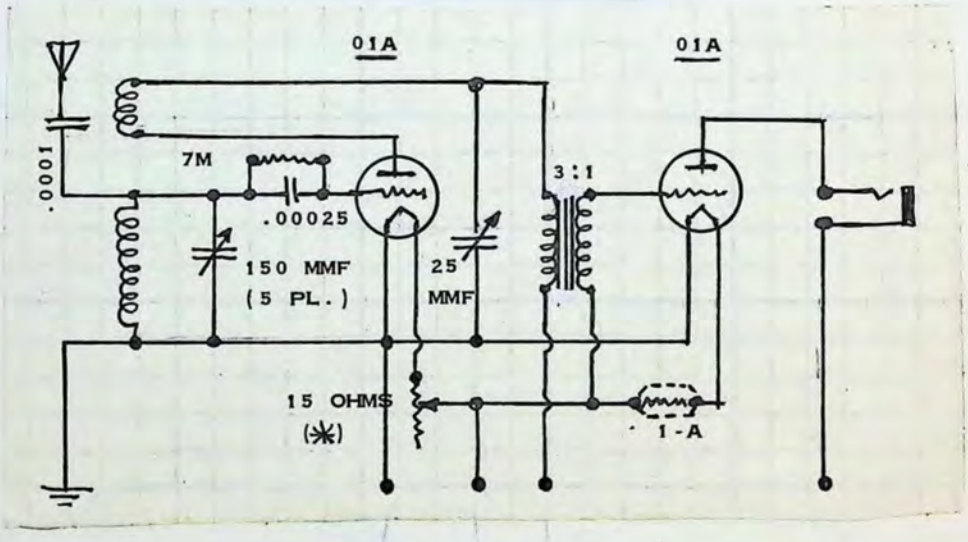


Like every other radio engineer of the Twenties, when word of the screen-grid tube arrived from England, Lacault immediately began experimenting with it, and the above was the result. You might note the voltage reduction resistors in the leg of the A- lead. All early screen-grid circuits used various configurations of dropping resistors, some with resistors in both legs of equal ohmage, some with a larger resistance in the A- leg. All configurations worked, after a fashion, and that shown by Lacault was different.

R.E.L. SHORT-WAVE RECEIVER, 1926



PANEL - 7" x 12"



A+ A− B+ B+
B− 45V 90V

(*) = 6-OHMS FOR 12 TUBE.
30-OHMS FOR 99 TUBES.

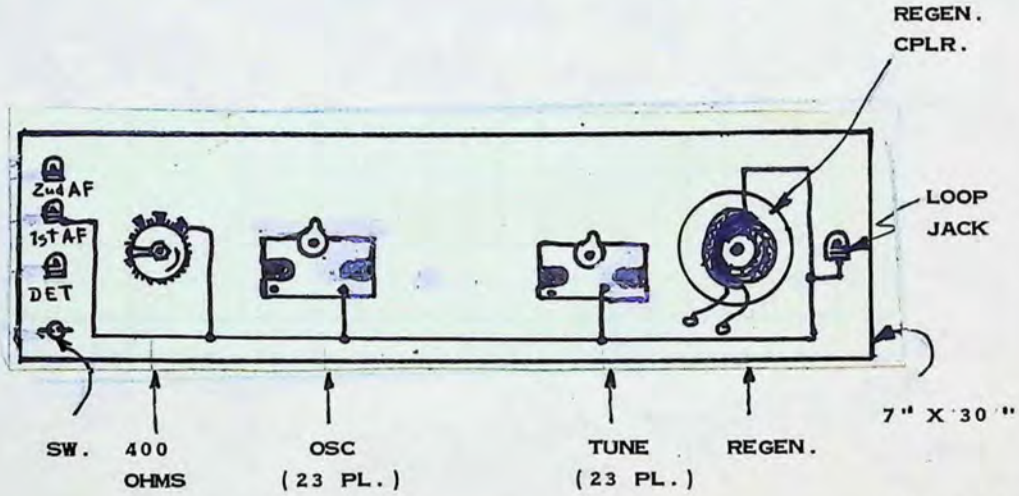
COIL DATA - 3" ϕ FORM - NO. 16 DCC WIRE

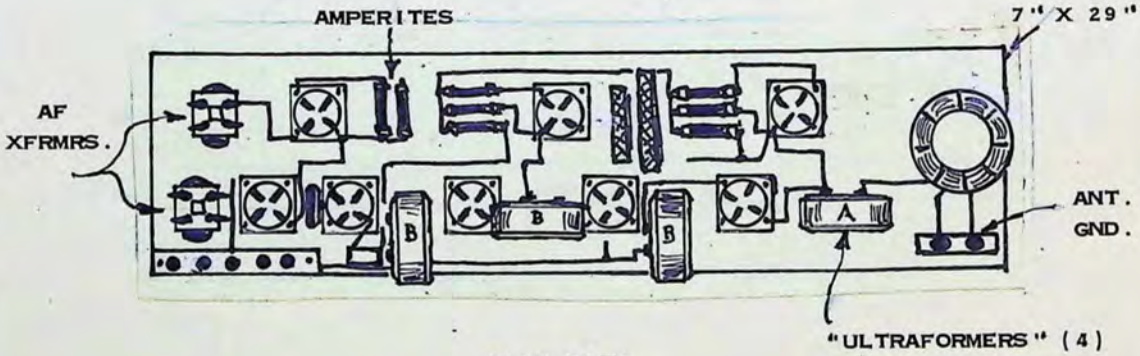
	METERS	GRID	PLATE	
(RLGCB - 26)	20	3T	4T	80 METERS 18T & 10TURNS.
	40	8T	5T	(LORENZ/R.E.L., OR EQUAL.)

LOG CHART FOR ULTRADYNE RECEIVERS

DATE	CALL	CITY AND STATE	Tuning Dial	Oscillator Dial	TIME	REMARKS

LACAULT's "ULTRADYNE L-2" SUPER-HET, 1925

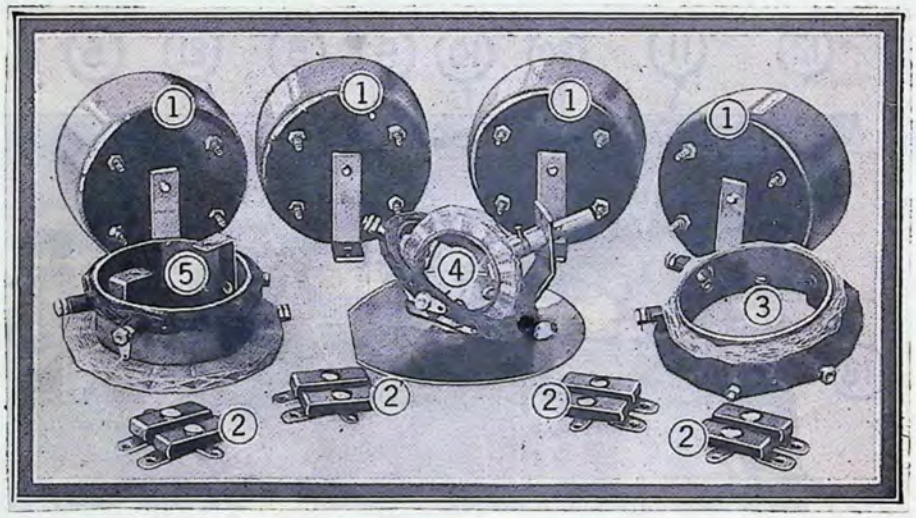




PLAN VIEW

RN 2-14
RW - 7-10-26
RA - 25
CB - 25
RNSHB

THE "ULTRADYNE L-2" SUPER-HET, 1925

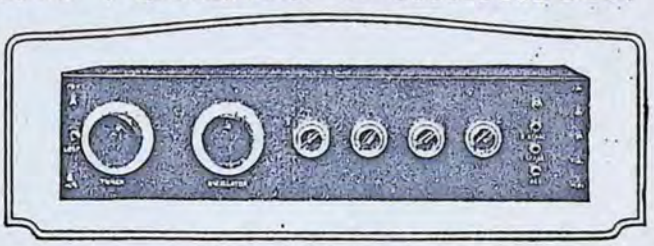


The *"ULTRADYNE"*, when first offered, consisted of the items shown above and listed below:

1. "Ultraformers" RF Xfrmrs.
2. Fixed condensers.
3. Oscillator coupler.
4. Regenerative coupler.
5. Antenna coupler.

The kit permitted you to construct either a six-tube or eight-tube receiver, the latter simply having the AF amplifier included.

Distance, Selectivity and Volume Combined.



"The Standard of Comparison"

ULTRAFORMERS
Types "A" and "B"
Especially designed radio frequency transformers for use in the Ultradyne receiver. Type "B" may be successfully employed in any superheterodyne circuit as radio frequency transformers.

$5.00

Send for thirty-two page illustrated book giving complete details on "How to Build and Operate the Ultradyne."

50c.

ULTRADYNE
The Improved
SUPER-HETERODYNE

The Ultradyne is a simplified and improved Super-Heterodyne. The Ultradyne employs the "Modulation System"—an entirely new principle in radio reception just developed by R. E. Lacault, A.M.I.R.E, who spent four years in research work in the Radio Division of the French Signal Corps.

This new principle is of such a nature as to increase the sensitiveness of the set over that of any known receiver—reduces to a minimum the controls employed, making the set easier to tune. Weakest signals are made to operate the loud speaker.

The Ultradyne, in addition to the "Modulation System," incorporates every good feature of the Super-Heterodyne.

SELECTIVITY—Completely cuts out all local stations at any time and receives distant ones clear and distinct.

SIMPLICITY—In tuning there are only two dials to adjust. These are vernier dials, which can be calibrated for all stations.

RANGE—Brings in distant stations that other receivers fail to get under the same conditions. Covers the whole broadcast wave length range. Truly a remarkable receiver of unusual merit.

Write for descriptive circular.

PHENIX RADIO CORPORATION
3-7 Beekman Street New York City

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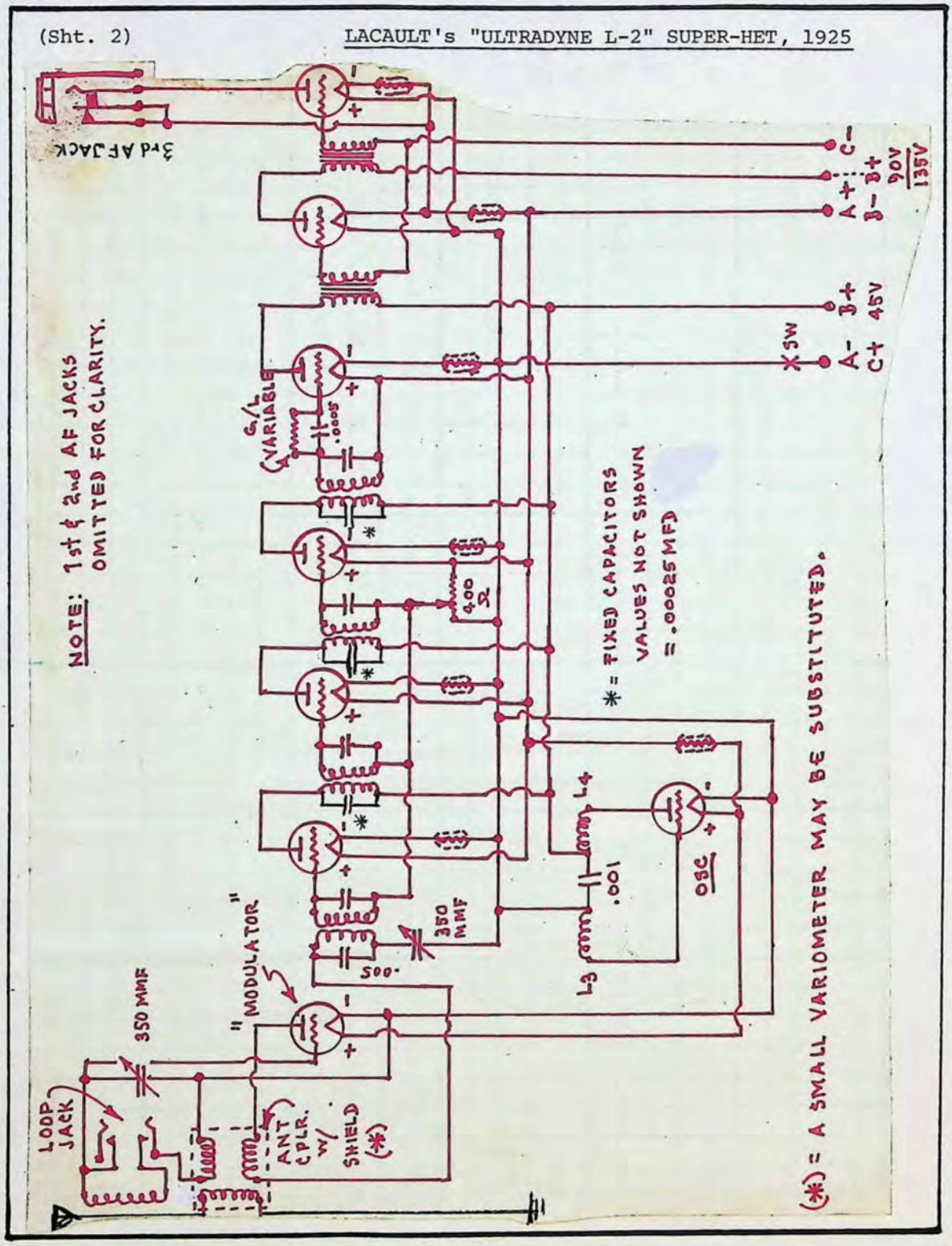
(Sht. 2) LACAULT's "ULTRADYNE L-2" SUPER-HET, 1925



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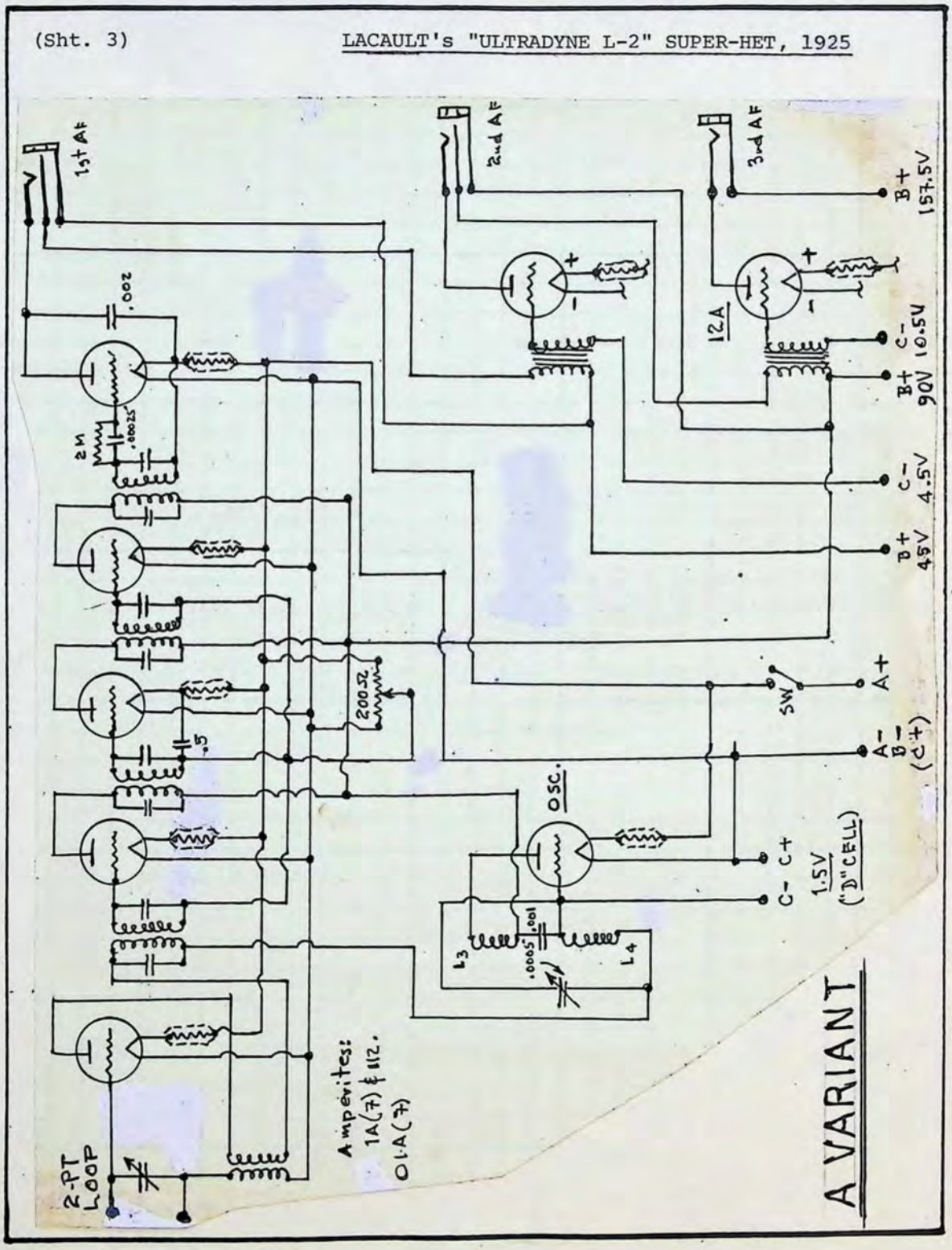
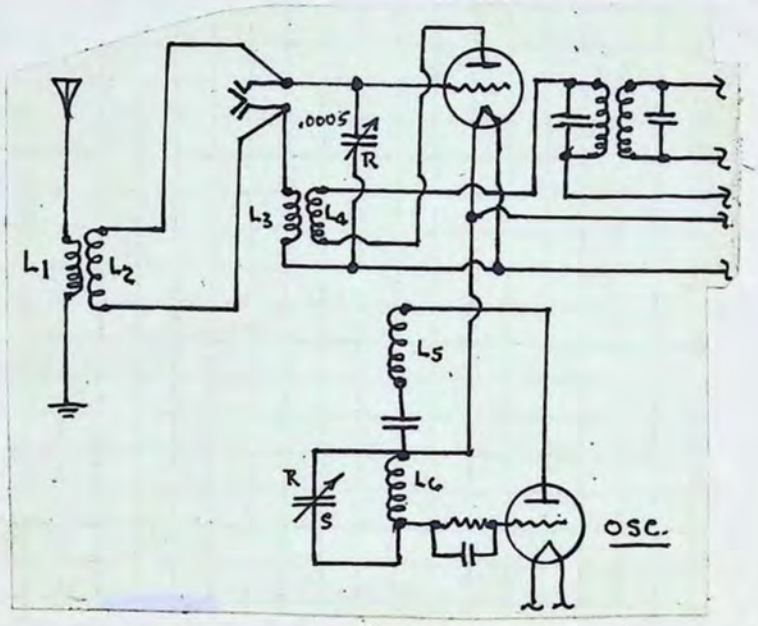
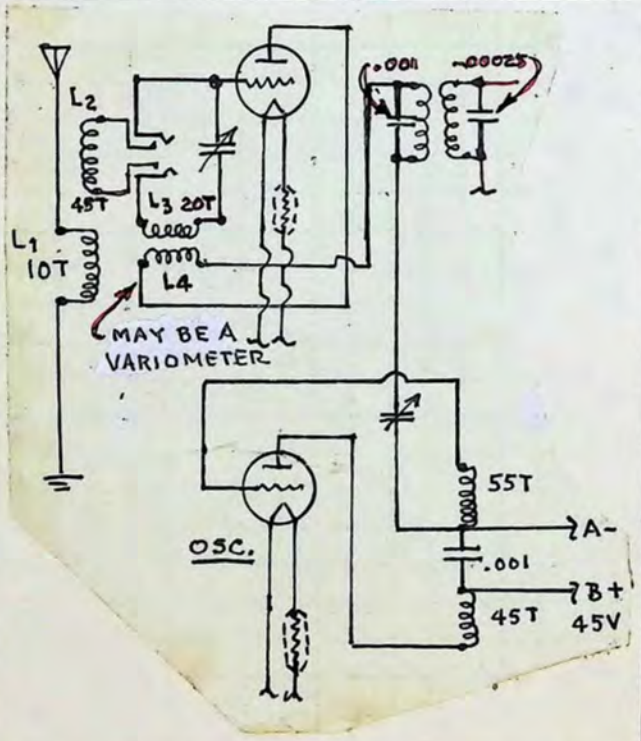
LACAULT's "ULTRADYNE L-2" SUPER-HET, 1925

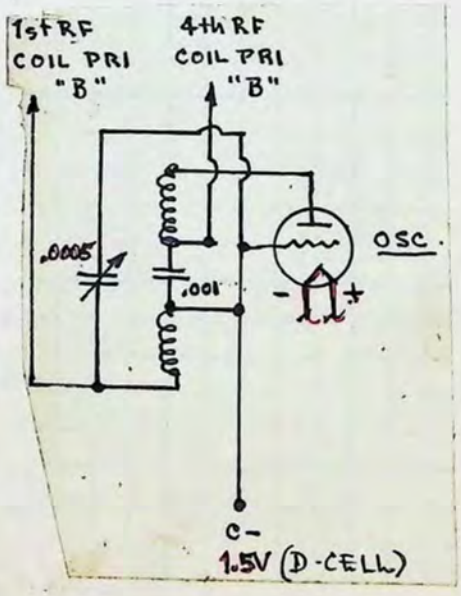


LACAULT's "ULTRADYNE L-2" SUPER-HET, 1925

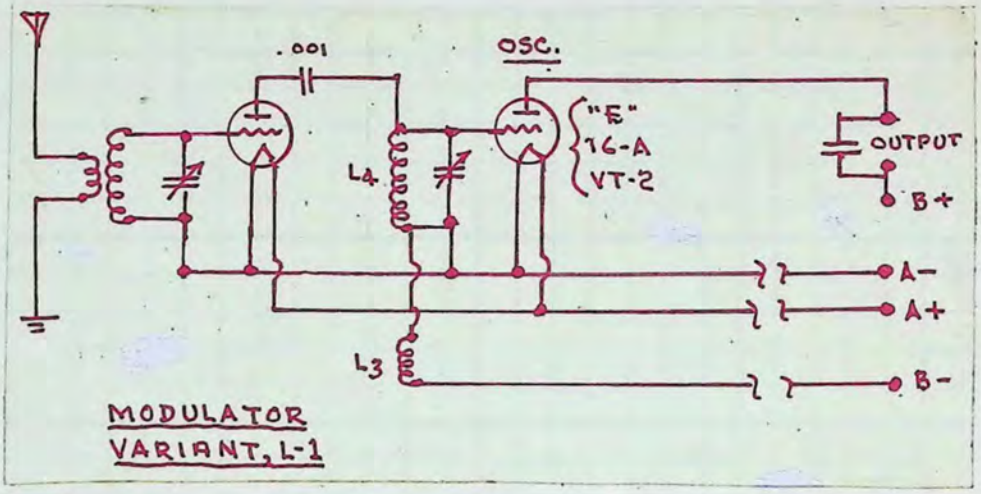
Modifications by Lacault in 1926. All Amperites 1-A. L4 was wound on a 2"Ø form for flexibility.

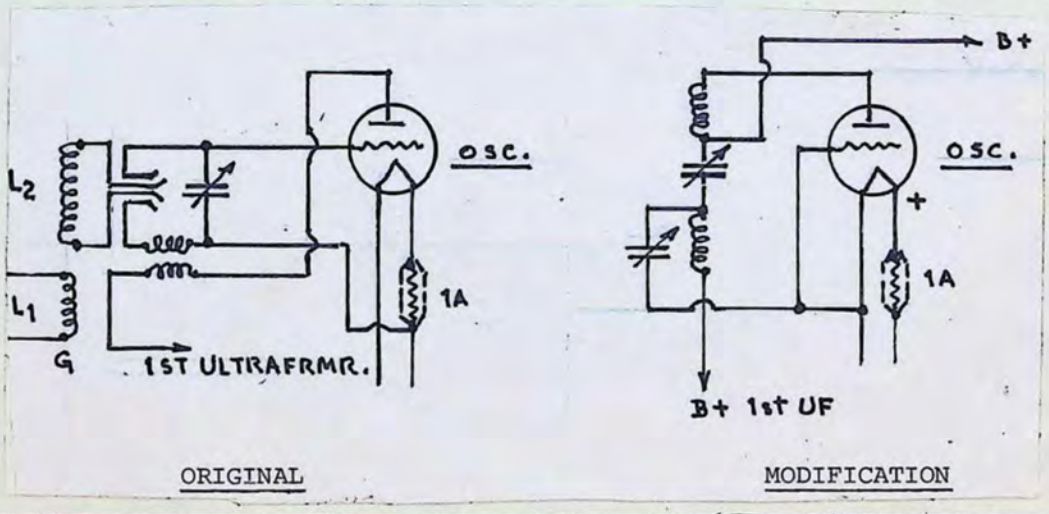


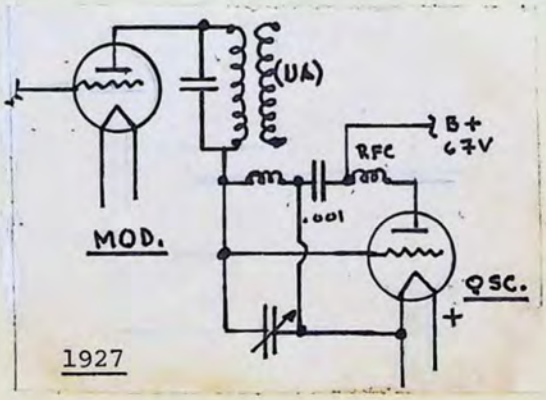




LACAULT's "ULTRADYNE L-2" MODIFICATIONS, 1925







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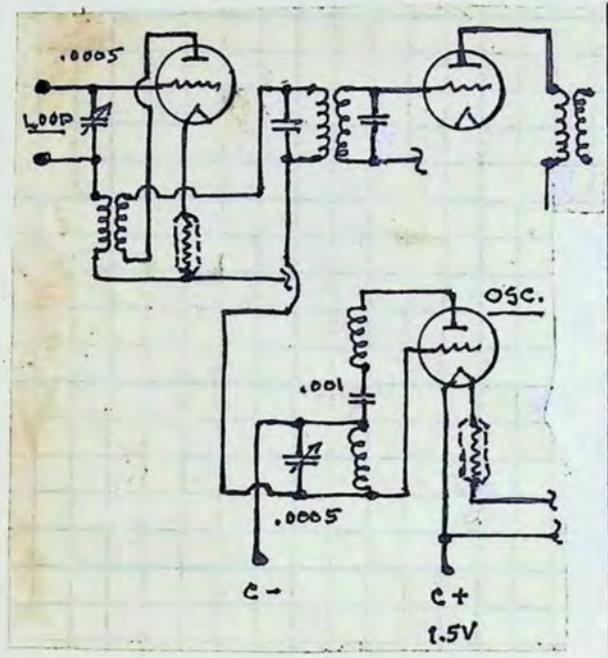
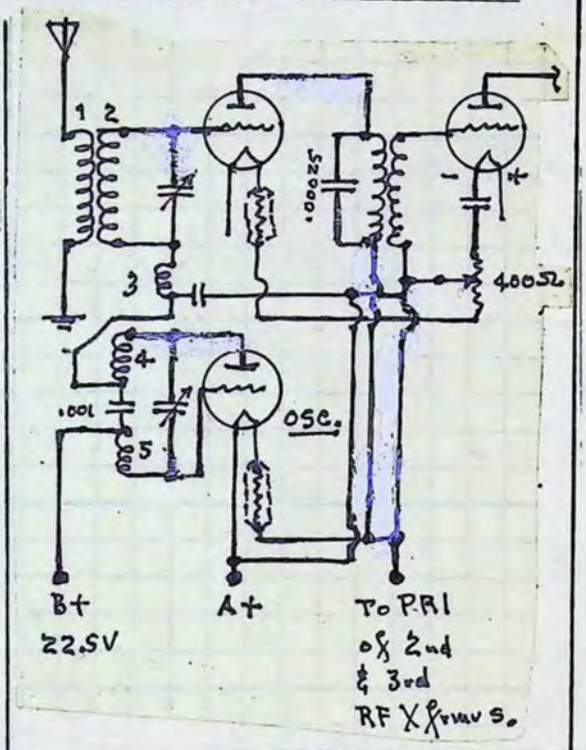
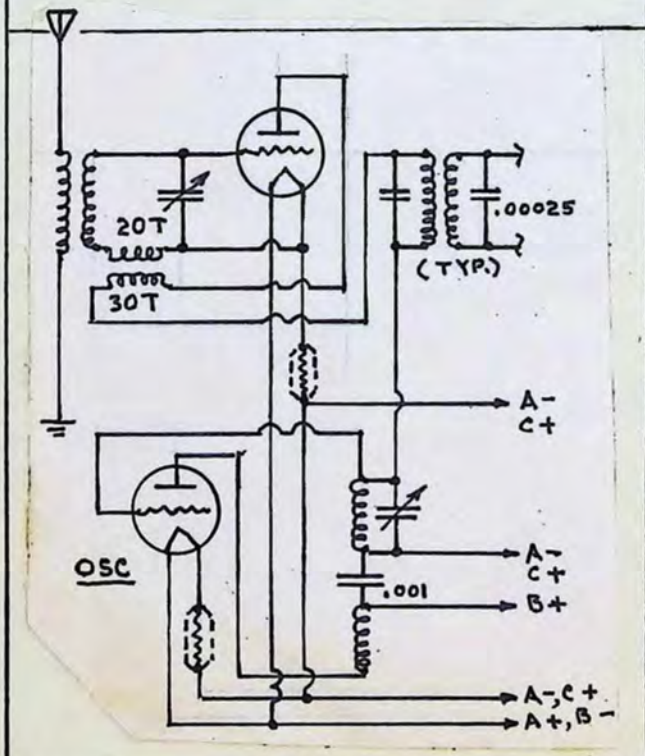
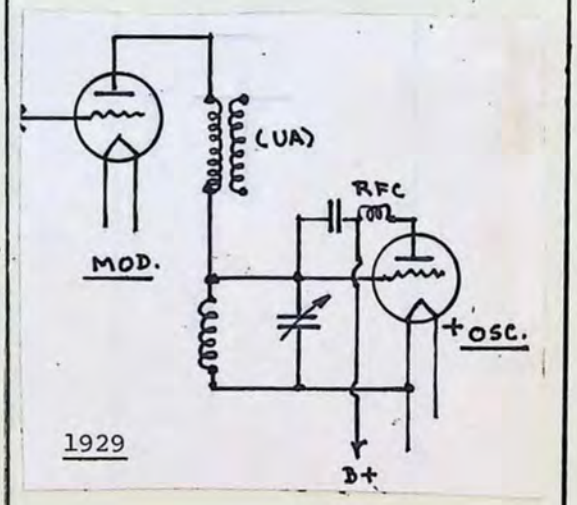
LACAULT's "ULTRADYNE L-2" MODIFICATIONS, 1925









"ULTRADYNE L-2" SUPER-HET, 1925

GENERAL NOTES:

"Ultraformers" should be mounted at right angles to each.
PRI across the first "Ultraformer" was 300T, not 500T.
Three of the "Ultradformers" were iron-core: one was air-core. The air-core transformer consisted of #28 DSC wire, 500 turns wound in a ¼" slot. The SEC was wound in two sections, one on each side of the PRI, and were in series. Wire was #30 DSC, 550 turns, wound in a 1/8" slot. PRI was wound on a ¼" dowel; SEC on a 1/8" dowel.
The iron-core "Ultraformers" were peaked at 30 KC.
Filament of the AF tubes controlled by a FIL control jack.
AF transformers were of the low ratio type.

COIL WINDING DATA

L1 & L2 wound on a 3¼" Ø form with ¼" seperation between the windings, with #22 DCC wire. PRI = 10 turns; SEC = 45 turns.
L3 used only when a loop was employed. it is done awate with when L4 is placed in inductive coupling. Otherwise:

L3 = 22 turns #22 DCC on 2½" Ø tube.
L4 = 25 turns #22 DCC on 2" Ø tube inside L3.
L5 = OSC grid coil: 45 turns #22 DCC on 3¼" Ø form.
L6 = 35 turns #24 DCC wound on same form with L5.

The beginning of the ANT coil is brought to the GND post.
Beginning of the SEC winding of L2 is brought to the inside tab of the double circuit jack, this being the lower terminal. The other internal tab of this jack goes to the end of L2.
The outer (upper) tab of jack is connected to the stator of C1, and to the grid post of the modulator tube socket.
The last connexion on the jack goes to the beginning of the grid winding on L3.
The end of L3 winding is brought to the rotor of C1 and to one tab of the switch: the other tab of the switch is connected to A-/C+.
The beginning of L4 (movable coil) is brought to the plate post of the modulator tube; the end of the winding is brought to the plate post of the 1st IF tube, and then connected to one tab of C4.
B+ terminal of the first "Ultraformer" and the other tab of C4 is connected to the stator of C2 and the beginning of the winding for L5. It is further connected to the grid post of the OSC tube socket.
The rotor of C2 is brought to the end of the winding; to

"ULTRADYNE L-2" SUPER-HET, 1925

the rotor plate of C2; to one tab of C3; and to the open end of the switch.
The other tab of C3 is brought to the B+ post of the 2nd IF transformer, and to the B+ 67.5V post.
The end of this winding is connected to the plate post of the OSC tube socket.

NOTE: Jack connections sketched on page 48 may give you a clearer idea of connections, along with the above.

OPERATING PROCEDURES

1. Turn OSC dial 1° at a time.
2. For each degree, rotate Tuning dial fully.
3. Procede in one degree steps until a signal is heard, which will come in as a hissing sound.
4. Adjust potentiometer for no hiss or whistle.
5. When tuning another station, turn the feed-back coupler to "0" (coils at right angles).
6. Re-adjust feed-back coupler after station has been tuned in for maximum volume or signal strength.

SUBSEQUENT COIL DATA

Lacault re-designed his coils several times during the life of the "Ultradynes" (not the "Ultraformers"), and the coil-winding data listed below were those he stayed with for awhile.

100 - 200 Meters	Standard Broadcast
L1 = 4T, #18 DCC	L1 = 15T, #14 DCC, 3"Ø Form
L2 = 15T, "	L2 = 50T, " , 4"Ø "
L3 = 10T, "	L3 = 15T, #24 DSC, 3"Ø "
L4 = 12T, #18/#20 DCC	L4 = 36T, #18 " , (*)
	L5 = 36T, " , (*)

(*) = wound on the same form 3.628" Ø.

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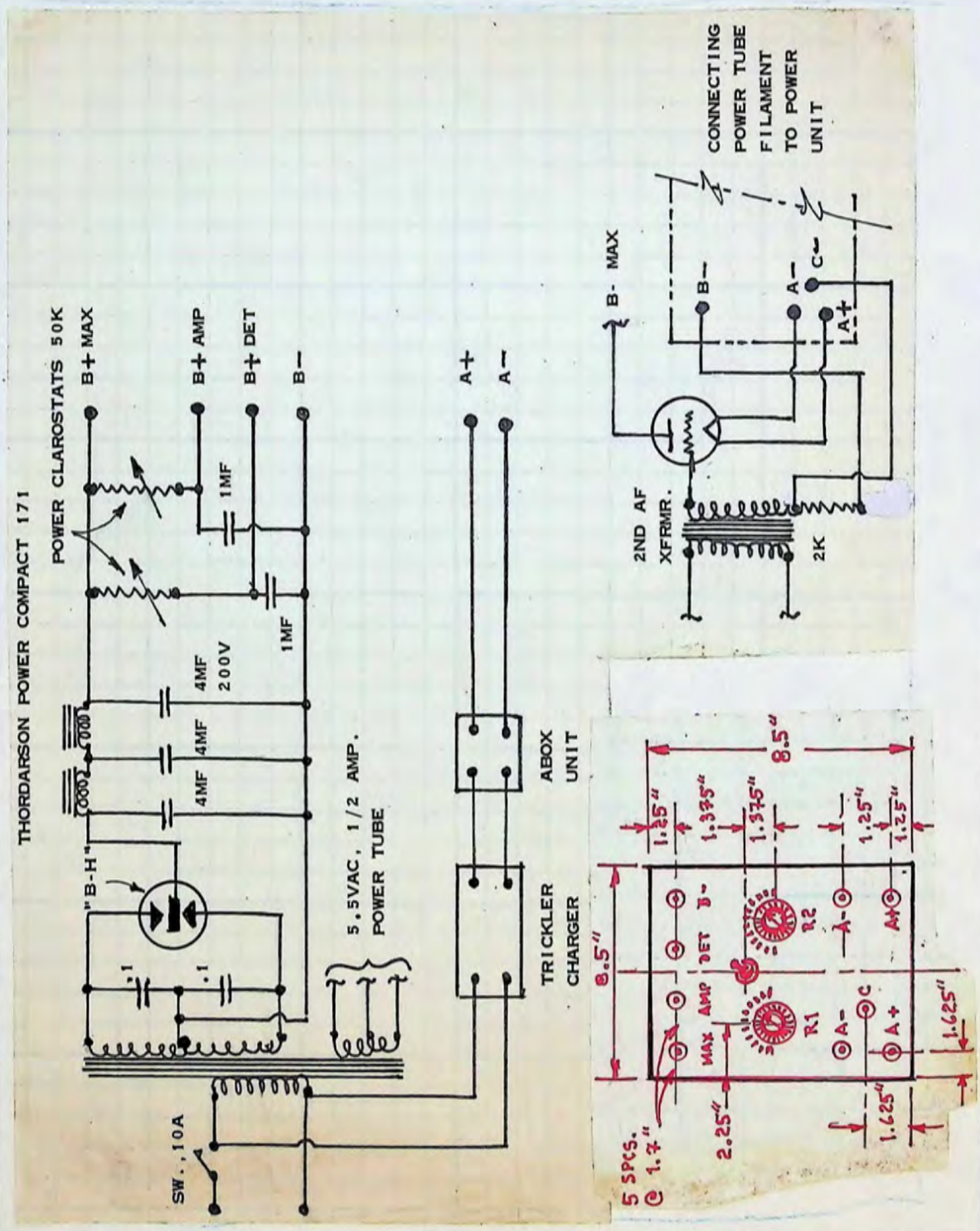
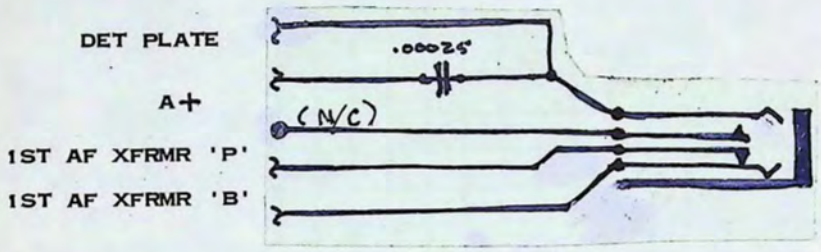
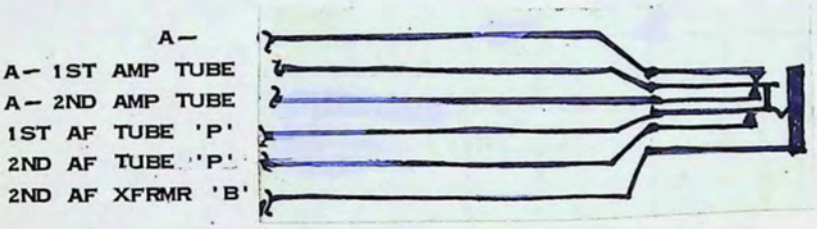
THE "ULTRADYNE L-2" POWER SUPPLY, 1926



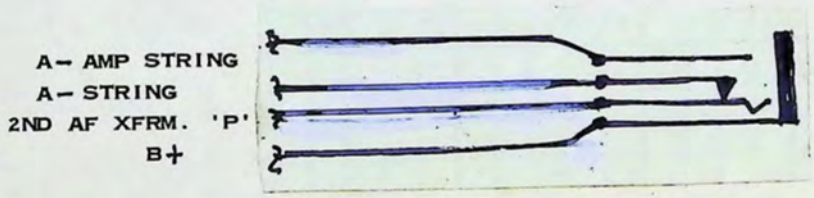
"ULTRADYNE L-2" JACK CONNEXIONS



DETECTOR JACK



1ST STAGE AF JACK



2ND STAGE AF JACK

TROUBLE-SHOOTING THE "ULTRADYNES"

As with all of the early radio receivers, there may be times when your ULTRADYNE is not performing at its highest efficiency. The trouble-shooting checks which follow were designed by Lacault, and you will find that they work very well.

Part of the adventure and wonder, as well as the sense of satisfaction, that comes from constructing one of the early circuits and having it work, was the ability to trace out and correct problems. Also, of course, trouble-shooting one marque did not automatically carry over to another circuit, which increased the sense of adv enture.

Test set-ups on the next page indicate a simplicity of parts and application, all of which you should have in your workroom.

OSCILLATOR MODULATION CIRCUIT:

1. Connect a pair of phones in place of the PRI of the first "Ultraformer" (Type A) across the .001 condenser.

2. You should hear some CW signals when tuning both the tuning and oscillator variable between 0 and 15.

3. If CW signals are heard, the modulator and oscillator circuits are working.

4. If no signals are heard, look for a wrong connexion in the oscillator coil, a broken joint, a bad variable or fixed condenser in accordance with tests which follow.

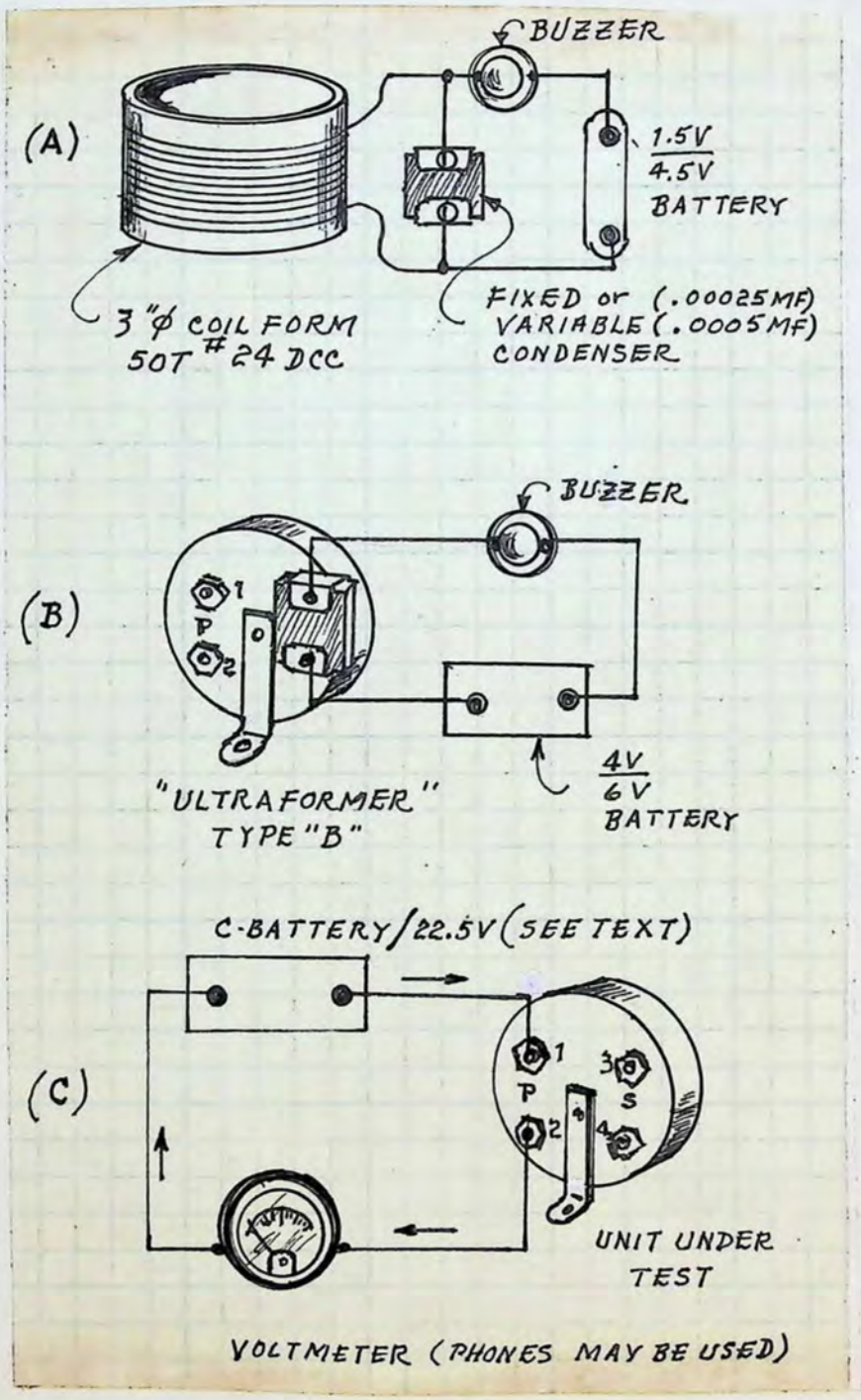
5. Check antenna or loop for bad or broken connexions in the tuning coil, loop jack, or tuning variable. The simplest way to test ANT and GND is to connect them to another set. If the set works, the ANT and GND of the ULTRADYNE are good.

6. Weak signals may be caused by a leakage across the blades of the loop-jack. Too much solder creates a resistance, and will cause the set to tune broadly.

7. If you are using a loop, it should be connected to the set by two seperate wires and a good plug. Lamp cord not more than three feet is a good wire to use.

8. If the set works with the loop but not with the wire type, check the outisde loop blade contact with the inside blade, along with the tuning coil.

TROUBLE-SHOOTING THE "ULTRADYNES"



TROUBLE-SHOOTING THE "ULTRADYNES"

TESTING WITH A BUZZER:

A very simple and most effective test instrument is the buzzer testing outfit shown in Figure A on the preceding page. It is very easy to assemble and acts as a small spark-sending station. When a battery is connected to the buzzer, signals are sent which may be tuned in on the set by adjusting the two variables. At the proper setting, if the set is working properly, you will hear the buzzer, which will tell you that the tuning and oscillator circuits are functioning well. The buzzer outfit is not connected to the set in any manner, merely placed near the tuning coil or loop.If the buzzer signal is too loud, simply move it a few feet from the set.

DETECTOR CIRCUIT:

1. Remove all tubes from the set except the DET.

2. Plug a pair of phones into the DET jack.

3. Remove or incapacitate the second or third "Ultraformer" and connect it as shown in Figure B.

4. Bring it near the last "Ultraformer"(Type B). The buzzer should be heard in the phones, decreasing in volume as you move the buzzer away from the set.

5. If the buzzer is not heard, check the grid-leak. Try another one. If no buzzer signal is heard, test the grid condenser as explained farther along.

6. If the DET functions properly, move buzzer away until the signal is very weak. Then try all tubes in the DET socket and select the one that gives the loudest signals. Use that tube as the DET.

I.F. AMPLIFIER:

If the DET functions properly as explained above, the trouble lies in the IF amplifier. Before testing the transformers and condensers, see that sockets and pots are in good order. Remove the "Ultradformers" from the set and test them as explained below.

A.F. AMPLIFIER:

1. If set operates with phones plugged into the DET circuit but not when in the First Stage jack, suspect the AF xfrmr.

TROUBLE-SHOOTING THE "ULTRADYNES"

2. Check the "C" battery with a voltmeter, making sure that the negative pole is connected to the transformer SEC, and the positive to the "A" battery lead.

3. Trouble in the Second Stage is checked the same way,

4. If the amplifier whistles, try reversing the connexions to the PRI of the first or second transformer. You might also try connecting a 100K-ohm resistor across the SEC of either one of them.

TESTING COILS & CONDENSERS:

1. Refer to Figure C. If the coil under test is in good order the meter will register the voltage of the abttery. If you are using phones, a strong click will be heard.

2. To test the windings of the "Ultraformers", connect the leads from the battery and meter to Posts 1 and 2 to test the PRI; then to 3 and 4 to test the SEC. If meter does not register, windings are open.

3. To test variables and fixed condensers, connect them as shown in Figure C in place of the coil, and use phones in place of the meter.

4. Hook-up a 22.5V battery as shown.

5. A fixed condenser tested this way gives out no noise.

6. A variable tested this way gives out no noise when the plates are rotated.

7. If noise is heard in either case, replace or repair the condenser under test.

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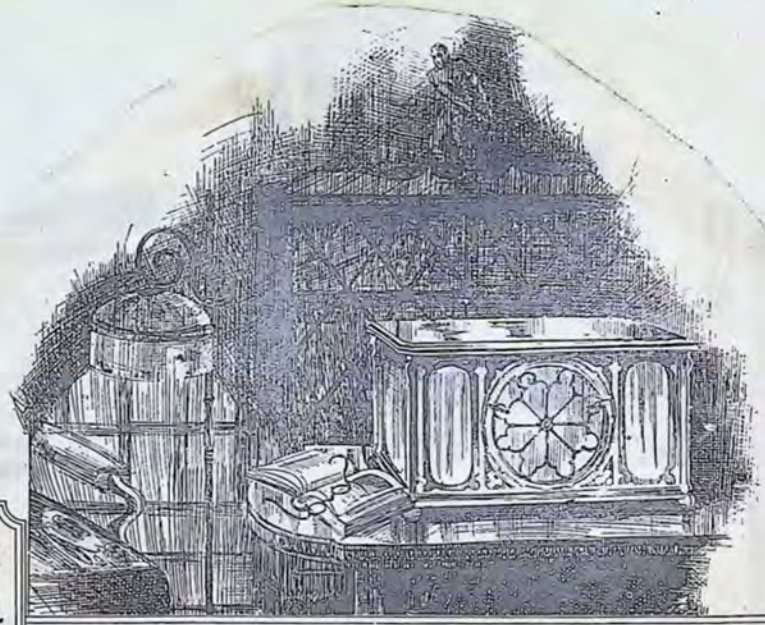


NO DIALS
—
NO PANEL
—
BUILT-IN
LOUDSPEAKER

For the Well Appointed Home

PEOPLE of taste will instantly recognize in the ULTRADYNE, Model L-3, the long-awaited perfection in *radio-musical instruments.* This new receiver offers complete mastery of the air's riches; effortless operation—as simple as playing a phonograph; and a new artistic form that blends harmoniously with its environment.

$135.00

West of the Rockies
$140.00

The ULTRADYNE, Model L-3, is a six-tube receiver employing the fundamental principles of the best circuits greatly refined and marvelously simplified. No dials—no panel; just two inconspicuous levers which constitute a station-selector. Volume adjustment, the only other control. Beautifully duco finished, duo-toned panelled mahogany cabinet.

To protect the public, Mr. Lacault's personal monogram seal (R.E.L.) is placed on the assembly lock bolts of all genuine ULTRADYNE Model L-3 Receivers. All Ultradyne Receivers are guaranteed so long as these seals remain unbroken.

Write for illustrated descriptive folder

ULTRADYNE
MODEL L-3

PHENIX RADIO CORP., 116 E. 25th St., New York

NEW ULTRADYNE

While this has become the cynically managed age of anti-hero, and vested interests have organised to reduce every aspect of human endeavour to the least common denominator of the crowd, the many, there are those who are gifted with a perceptivity above the mob. Heroes of any degree are thrown up by history, even the history of a hobby such as vintage radio, and serve to strengthen some ancestral, intuitive sense of the uniqueness of the human experience.

If the word "hero" bothers you, you may substitute exceptional men, who have contributed to our lives, one way or another. And as with any hobby or special interest calling, we, too, have had our sacred cows - such as the Octupus known as RCA, Philco, Crosley, Atwater-Kent, McMurdo Silver, not to mention E.H.Scott. But there is this about sacred cows - they cannot be attended by more than one cowboy at a time. Thus one's enthusiasm for a given marque remains private, personal, and can only be shared in an oral or verbal manner.

The romance and the lure of Radio cannot be found among our sacred cows but in the ranks of those pioneers who created a myriad of what we now call "orphan" marques, and who did not bend the knee to the Octupus.

Robert E. Lacault was such a pioneer, and has long fascinated me by the strange inconsistencies of his talents. His contributions to the advance of Radio were many, innovative, original, and several of his design concepts were later adopted by commercial radio manufacturers, even during his brief lifetime.

From his early "Concerta" of 1923 through his RE-29, 1929, one might plot a straight line continuum of a dedicated pushing against the frontiers of radio knowledge, theory, and practice. He was capable of changing his mind, but not too far. For example, in the early days while he was the senior editor for Gernsback, he violently opposed installing panels on a breadboard, and wrote a rather sophomoric defense. By 1925, however, he had gone through a shift of 180°, as witness the lovely, ornate, and powerful "Ultradyne L-3".

But the "L-3" seems to have marked another turning point in his career, in that the imaginative innovativeness and patent creativity of the "L-3" was never again attained, despite his subsequent design of circuitry which was reflective of the advancing state-of-the-art - advances which he helped along. He did not have the razzle-dazzle of McMurdo Silver, the egocentricness of Lynch, or the eccentricity of Scott; nor did he have the cool rationality of Victoreen, the social awkwardness of De Forest. What he did have was a sense of his own becoming, and that, I might add, is even more rare today amid the vast army of me-too poseurs cluttering-up our ranks.

The "L-3" was a 6-tube radio, with built-in speaker and two battery compartments in the two-toned mahogany cabinet. The novel arrangement of dialing in a station was the small lever on the perifery of the speaker grille. One simply rotated the lever until a station was heard. This arrangement was employed by Thompson for their "Minuet R-81", although I have not been able to find out which was first.

Among the advert copy of the time were these words:

"The cabinet is a splendid piece of modified Italian Renaissance furniture, in two-toned, panelled mahogany...unobtrusive and of truly artistic appearance, it conforms with the dictates of good taste which demand harmony, quiet beauty, and inconspicuous efficiency."

The copy also stated that the circuit was one that "employed the fundamental principles of of the best circuits greatly refined and marvellouly simplified". This suggests that it may not have been a totally new circuit by Lacault, except, perhaps, for his covetted coils.

As I've mentioned elsewhere, I've not seen an "L-3", nor do I know of anyone who has, but I would like very much to find one. Of the thousands of media in my files, no schematic or specifications can be found.

ROBT. E. LACAULT & SINGER, 1925

A UNIQUE experiment in broadcasting was recently made by Mme. Elisabeth Rethberg, soprano of the Metropolitan Opera Co., and R. E. Lacault, former managing editor of "Radio News," and now Chief Engineer of the Phenix Radio Corporation. Mme. Rethberg was enabled to hear her own voice sent out over the air and received in the transmission room on an Ultradyne receiver.

The above cut is reproduced here for two reasons: my fondness for all things pertaining to Lacault; and the fact that in this cut is a partial view of the lovely *Ultradyne L-3* - the only instance that I have found of the set in action. Indulge me, if you will, please.

new ULTRADYNE

MODEL L-3

To protect the public, Mr. Lacault's personal monogram seal (R. E. L.) is placed on the assembly lock bolts of all genuine Ultradyne Model L-3 Receivers. All Ultradynes are guaranteed as long as these seals remain unbroken.

No Dials-No Panel Built-in Loud Speaker

IF the Ultradyne Model L-3 were merely another new receiver, its influence in the industry would be little felt.

But it is in reality the first step in the general revision of radio receiver design which is bound to follow its advent.

For the new Ultradyne Model L-3, is an entirely new type of receiver—radically different in appearance and method of operation—gives finer results from finer engineering. Employs six tubes—is completely assembled and wired, ready for the tubes and batteries.

It has no dials—no panel—no needless controls. Two levers, an exclusive Ultradyne feature, give you control of the entire broadcast program. Its operation is practically automatic—simply slide the pointer to the station you want and adjust the volume control, soft or loud as you like it.

Loud Speaker and "B" Batteries self enclosed in a beautiful cabinet that is far from mechanical in design and is an ideal mahogany furniture piece for the most charming home.

This new Ultradyne Model L-3 gives you the best there is in radio—truer reproduction than you have ever known before.

PHENIX RADIO CORPORATION 114-A East 25th Street New York

Ask your dealer for a demonstration. The contrast between the Ultradyne and other receivers is so marked that the desire to own one will be bred there and then.

$135

Write for descriptive folder

IF I WERE BUYING A RADIO SET
I'd want one with the machinery covered
Because
I'm not interested in machinery
But whatever gadjets had to show
I'd want done up pretty
Because
I'd want to put the set in the parlor,
Not in the garage.

I'D WANT a set that was put together to stay together,
That worked when I wanted it to work,
That was loud enough and clear enough
And didn't run amuck,
Because I haven't the time to learn
How to make it do what it wouldn't do.

AND what is more, I'd want a set
That would run circles around my neighbor's
That would do its stuff when company was around,
That wouldn't balk at a grade,
Because
I'm no piker
And I wouldn't own a piker's set.

THIS set would have "Go" to it like my car
And I'd be sport enough to give it a fighting chance,
Because
Anything that will deliver the goods "when" and "as"
With the odds against it
Is likened to me and my fellowmen,
And I'm for it!

And if ever a set answered the voice of Mr. Everyman, It's the

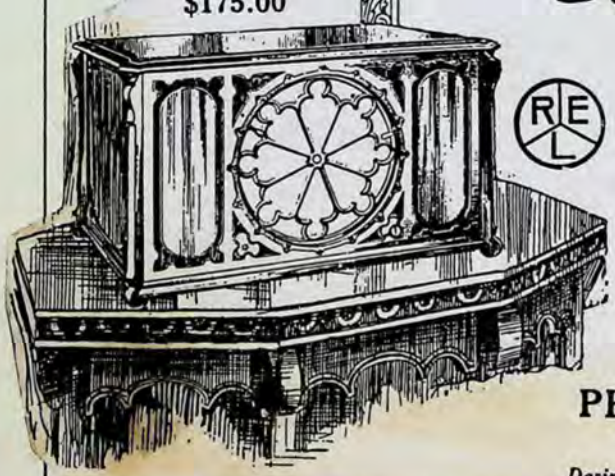
ULTRADYNE
MODEL L-3

$135.00

West of the Rocky Mountains $140.00

In beautiful Console Model

$175.00



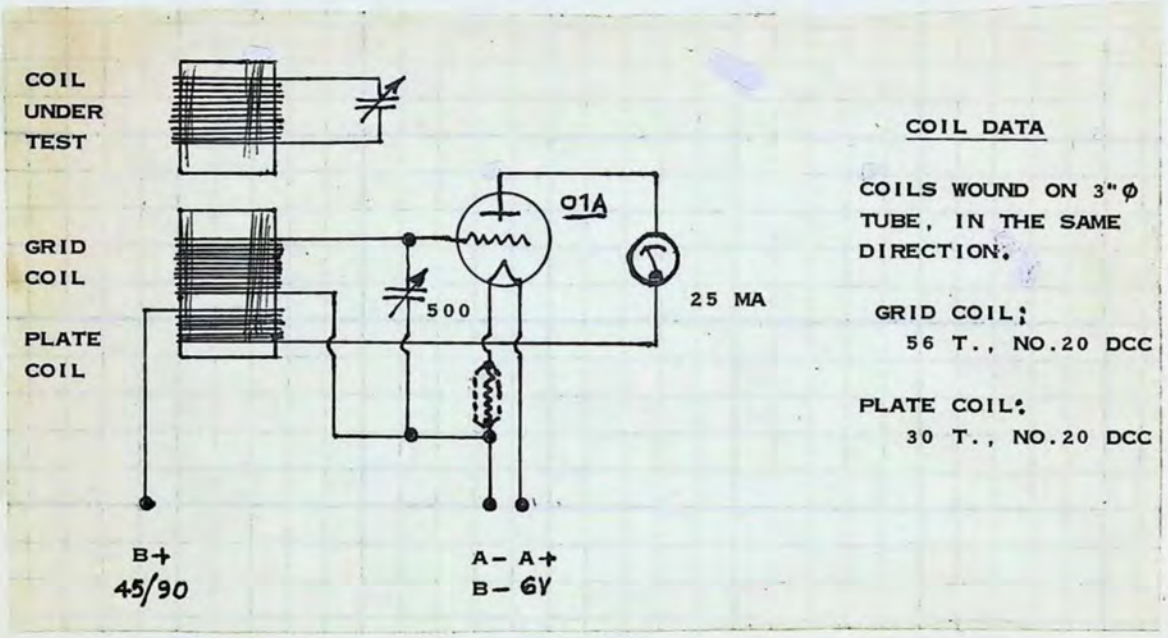
The Ultradyne Model L-3 is a six-tube receiver employing the fundamental principles of the best circuits greatly refined and simplified. No dials—no panel; just two inconspicuous levers that constitute a station selector.

The assembly lock bolts of all genuine Ultradyne Model L-3 Receivers carry Mr. R. E. Lacault's personal monogram seal.

Write for descriptive folder.

PHENIX RADIO CORPORATION
114 East 25th Street, New York City
Desirable Exclusive Territory still open for Authorized Dealers

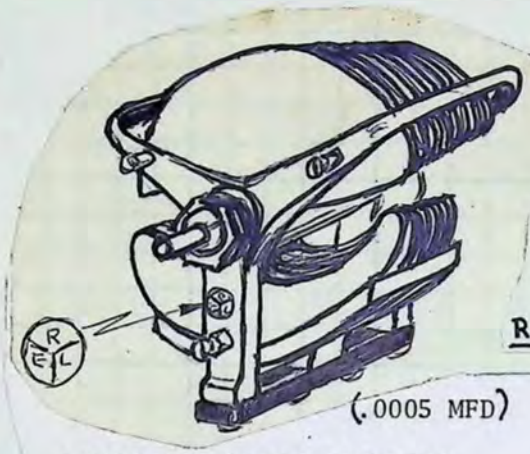
LACAULT COIL TESTER, 1925



PROCEDURE

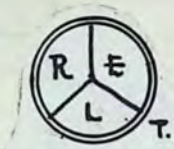
1. Place the coil to be tested, with its variable condenser, close to the end of the OSC coil.
2. Set test-coil variable at maximum capacity.
3. Turn OSC variable slowly and watch Ammeter.
4. At one point the Ammeter pointer will drop.
5. Decrease the variable of the test-coil & repeat Step 3, after shunting the coil.
6. Ammeter should drop again but at a different point.
7. If it does, the coil is good.

SOME LACAULT DESIGNED COMPONENTS



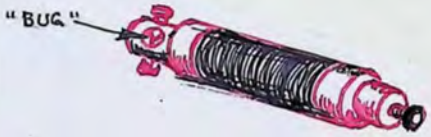
(.0005 MFD)

LACAULT'S "ULTRA-LOWLOSS" VARIABLE CONDENSER#1

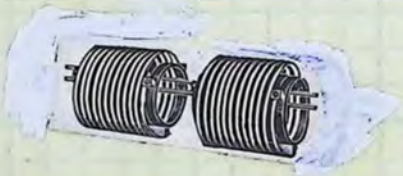


ROBT. E. LACAULT

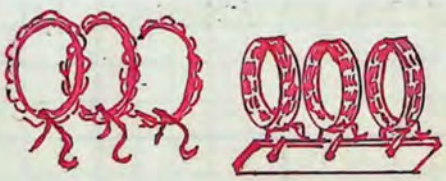
LACAULT's "ULTRA-VERNIER" TUNING CONTROL ($5)

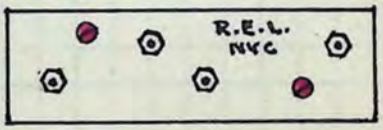


LACAULT RF CHOKE
0.9 mH/3.1-ohms
4" x .75" ø.
($1.10)



LACAULT XMTNG. COILS ($4)
10-150 meters; flat-wound on glass; ribbon-wire was nickel-plated; coupling was variable.





LACAULT SW. COIL KIT ($6)
15-100 meters w/ 100 MMF.

(Sht. 1) LACAULT's "ULTRADYNE L-4", 1926

NOTE: This receiver was also known as the *LR-4*.

GENERAL DATA

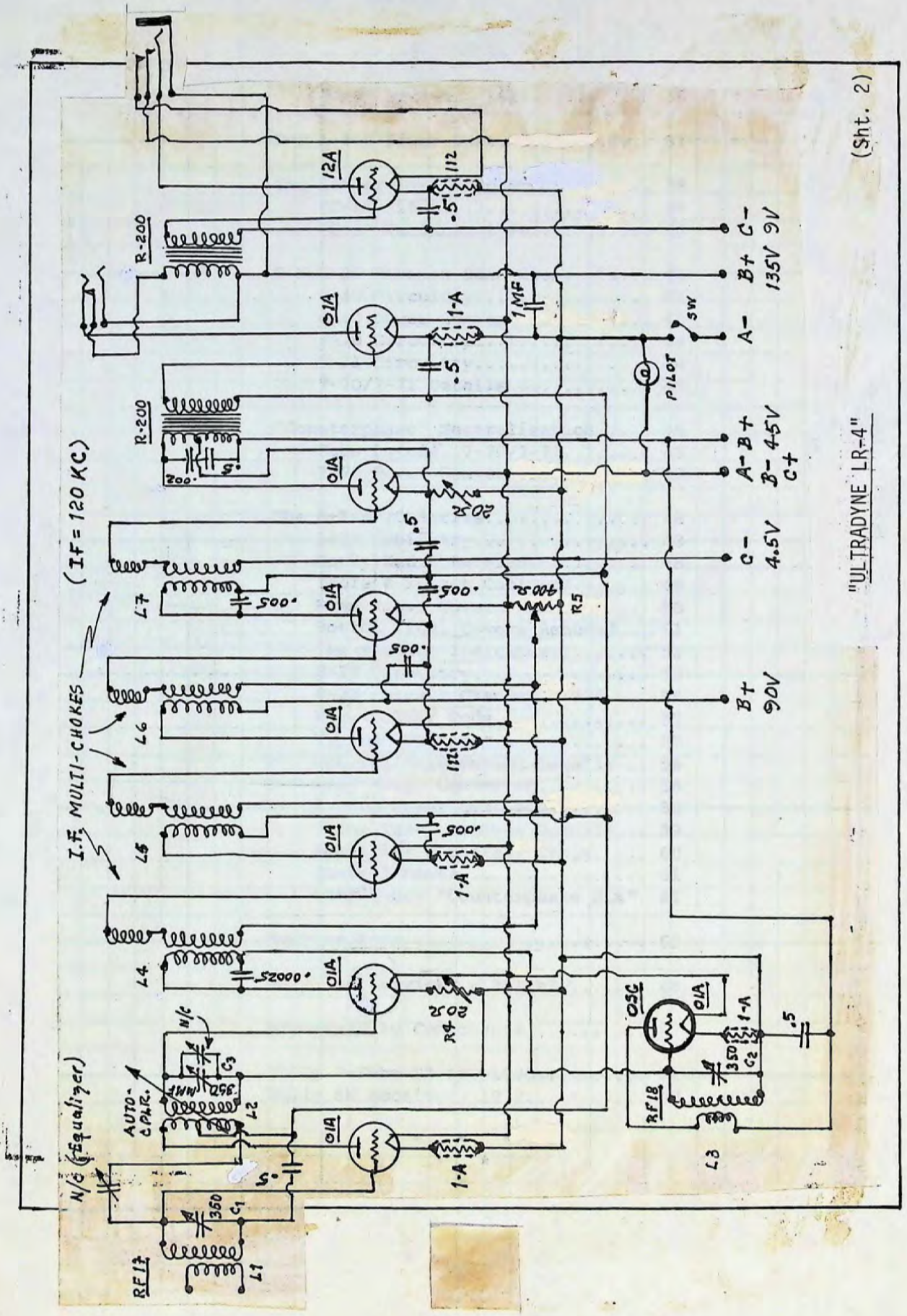
1. Switch incorporates the Pilot circuit.
2. The last AF tube employed a FIL control jack; it cut in the AF tube only when a speaker was plugged-in.
3. All shield cans were grounded together; each shield can was 6" x 6" x 7" (Alcoa).
4. On Coils L4-L5-L6-L7, lugs 1 and 2 were tied together.

NOTE:

If you do not have Lacault's original "Ultraformer" coils, Madison-Moore AC shielded coils may be used.

5. The designations below correspond with the designations shown:

C1-C2-C-3 = 350 mmf variables.
R4 = 20-Ohm Rheostat.
R-5 = 400-Ohm Potentiometer.


(Sht. 2)
"ULTRADYNE LR-4"
(IF = 120 KC)
I.F. MULTI-CHOKES
N/C (Equalizer)
AUTO-C.P.R.
RF12
RF18
OSC
R-200
12A
01A
PILOT
SW
A-
B+ 135V
C- 9V
A- B+ 4.5V
B- C+
C- 4.5V
B+ 90V
R4
R5
L1
L2
L3
L4
L5
L6
L7
C1
C2
C3

LACAULT "ULTRADYNE LR-4", 1926: Sht. 3

PARTS LIST

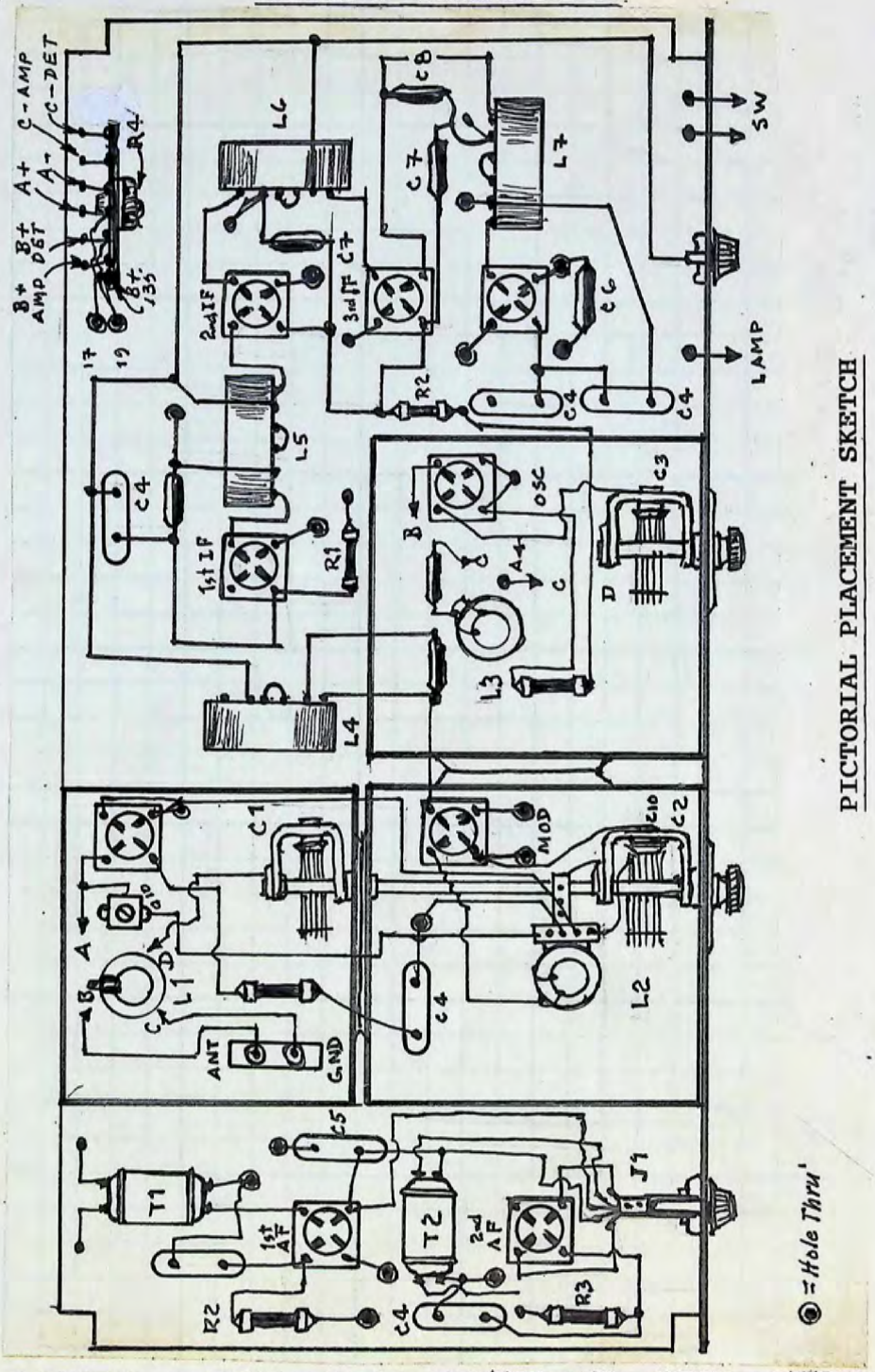
No. Required	Nomenclature
3	Hammarlund Midline Variables, 350 mmf.
3	" Shield Boxes.
1	" RF 17 Coil.
1	" RF 18 Coil.
1	" Auto-couple Coil w/ cam.
1	" 10.25" Shaft for dual control.
2	" "Equalisers" (Balancing Condensers).
9	Benjamin #9040 Sockets.
2	Mar-Co #192 Dials.
1	Yaxley 400-ohm potentiometer.
2	" 20-ohm rheostats.
1	" No. 3 Jack (Single Circuit).
1	" Switch w/ pilot-lamp.
4	Radiall "Amperites" 1-A.
2	" " 112.
9	Eby Engraved Binding Posts.
2	Thordarson R-200 AF Transformers.
4	Sangamo Mica Condensers .005 MF.
1	" " " .001 MF.
1	" " " .002 MF.
6	" " " .00025 MF.
1	" By-Pass " 1 MF, Series A.
4	Madison Multi- Chokes, 3 Std., 1 Type C.
1	Binding Post Panel.
2	Brackets for Binding Post Panel.
1	Panel 24" x 8" x 3/16".
1	Baseboard 25.25" x 12" x .5" w/ .25"ϕ Feet.
1	Cabinet to suit.

* * *

(AHB)

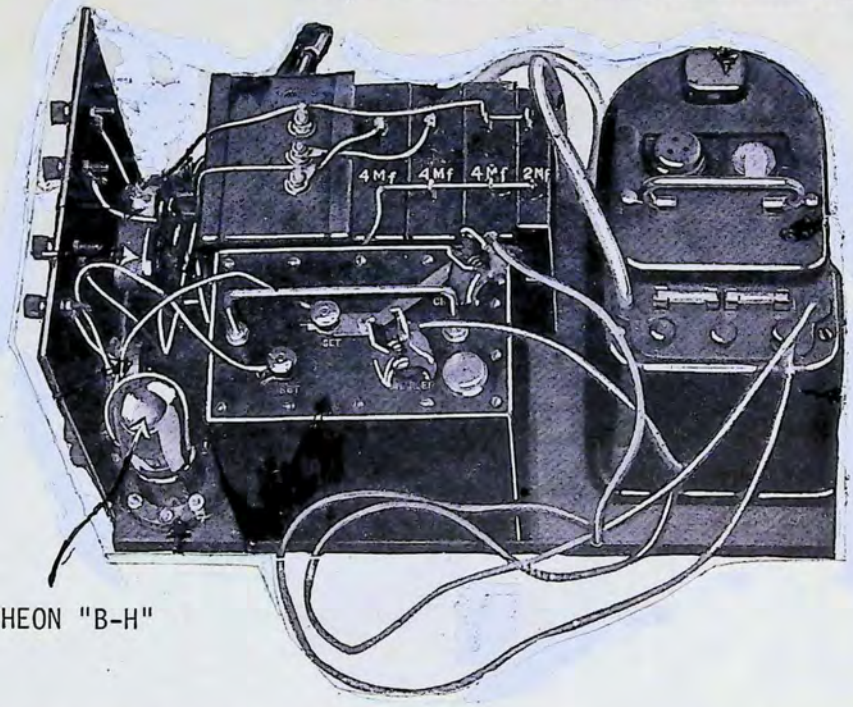
(Sht. 4)

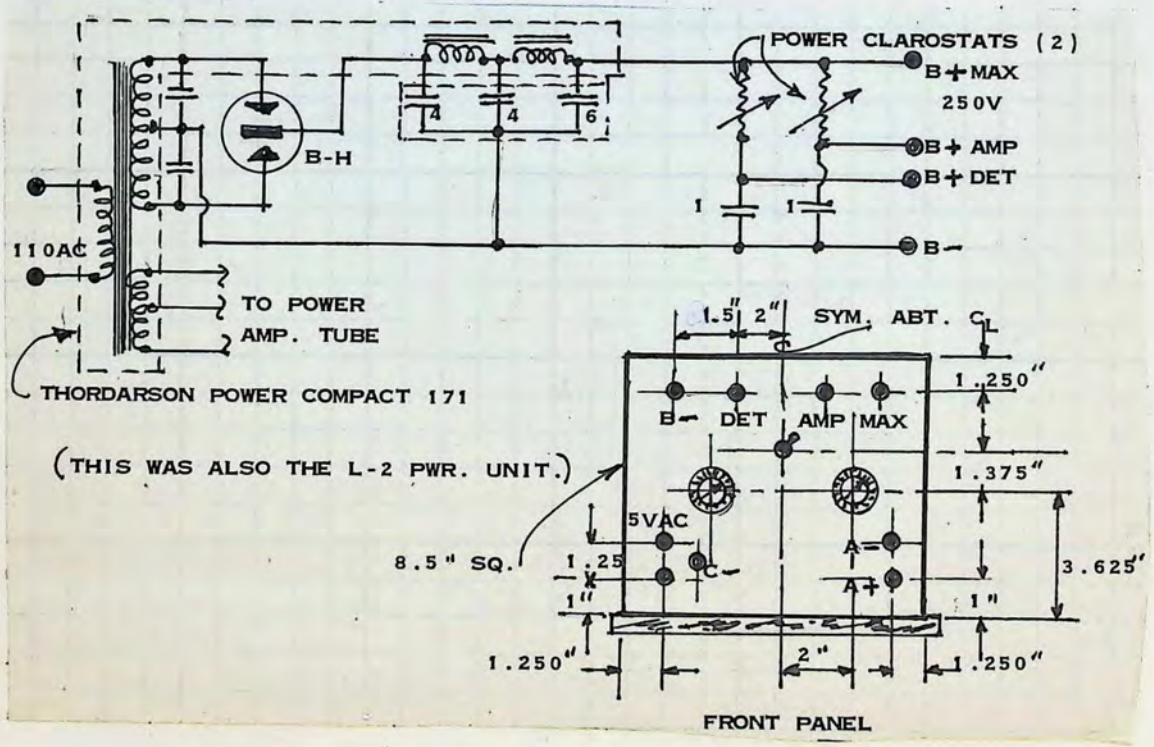
LACAULT's "ULTRADYNE L-4"



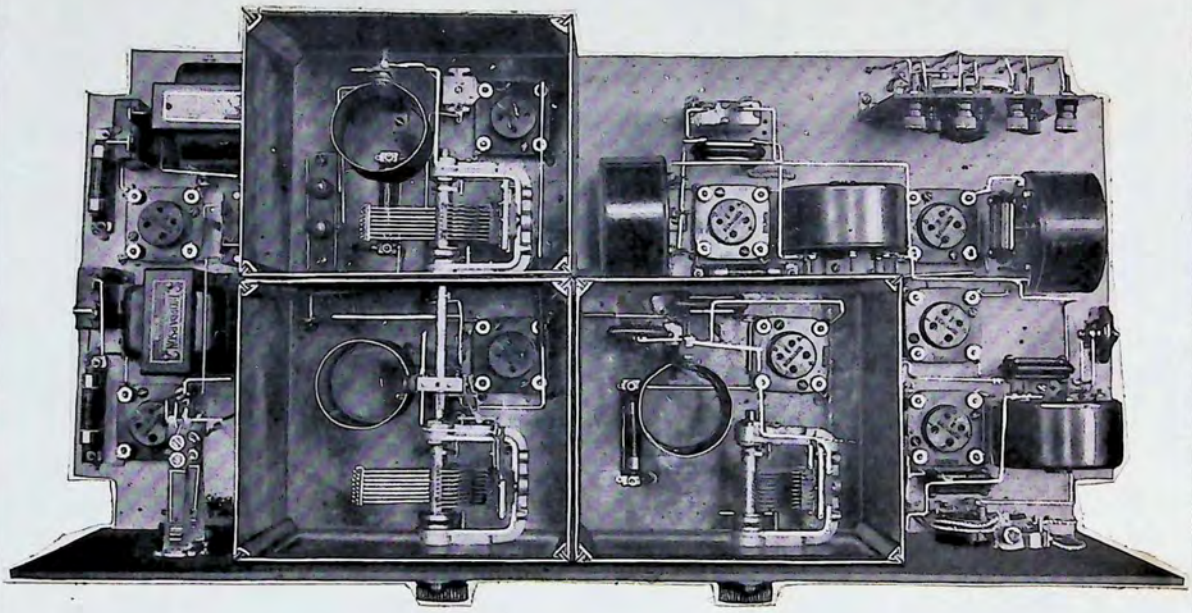
PICTORIAL PLACEMENT SKETCH

"ULTRADYNE L-4" POWER SUPPLY, 1926: Sht. 5

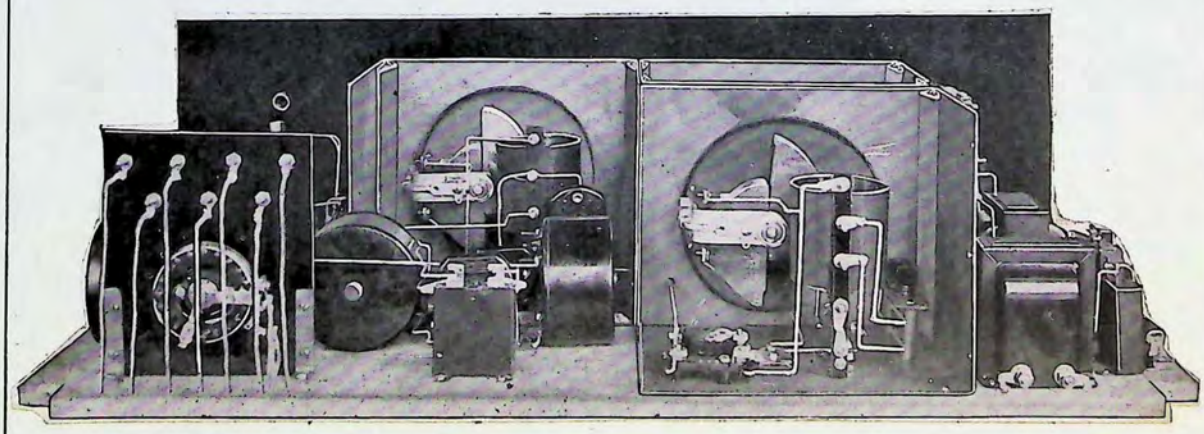




LACAULT's "ULTRADYNE LR-4", 1926: Sht. 6

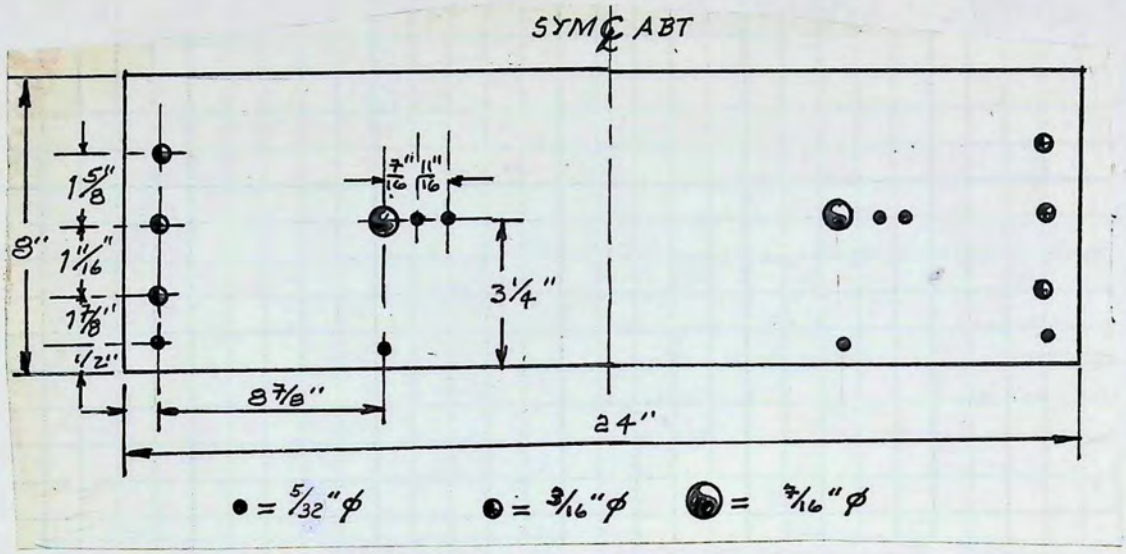


PLAN VIEW

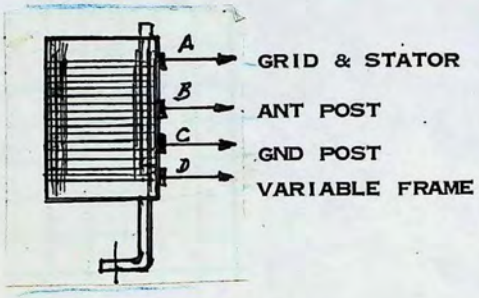


BACK VIEW

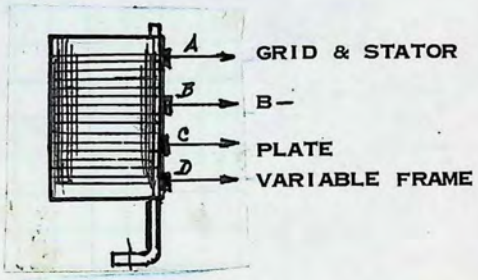
LACAULT's "ULTRADYNE LR-4", 1926



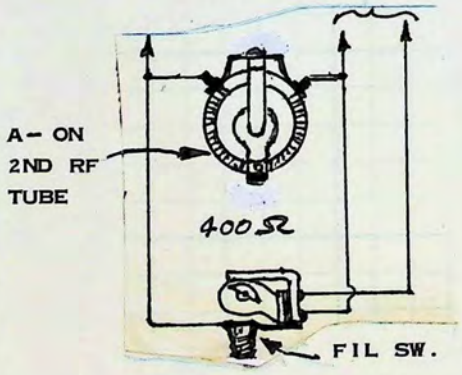
PANEL HOLE PATTERN

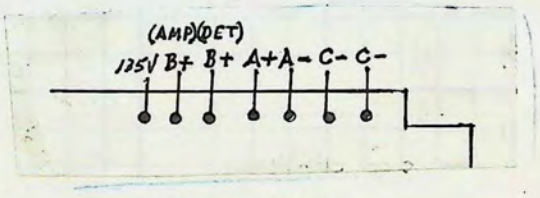


COIL CONNEXION
(LH Rear Shield)



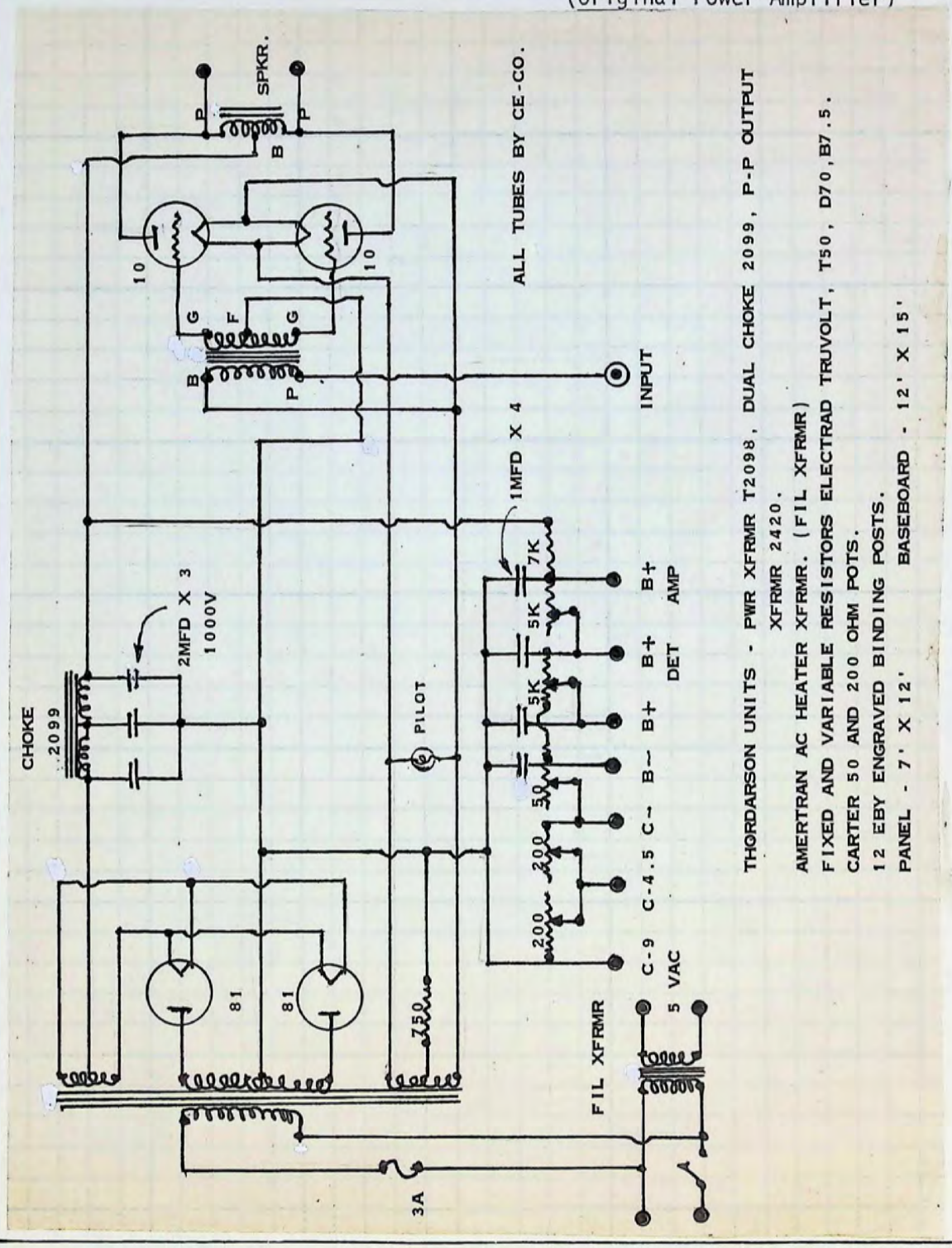
COIL CONNEXION
(RH Front Shield)



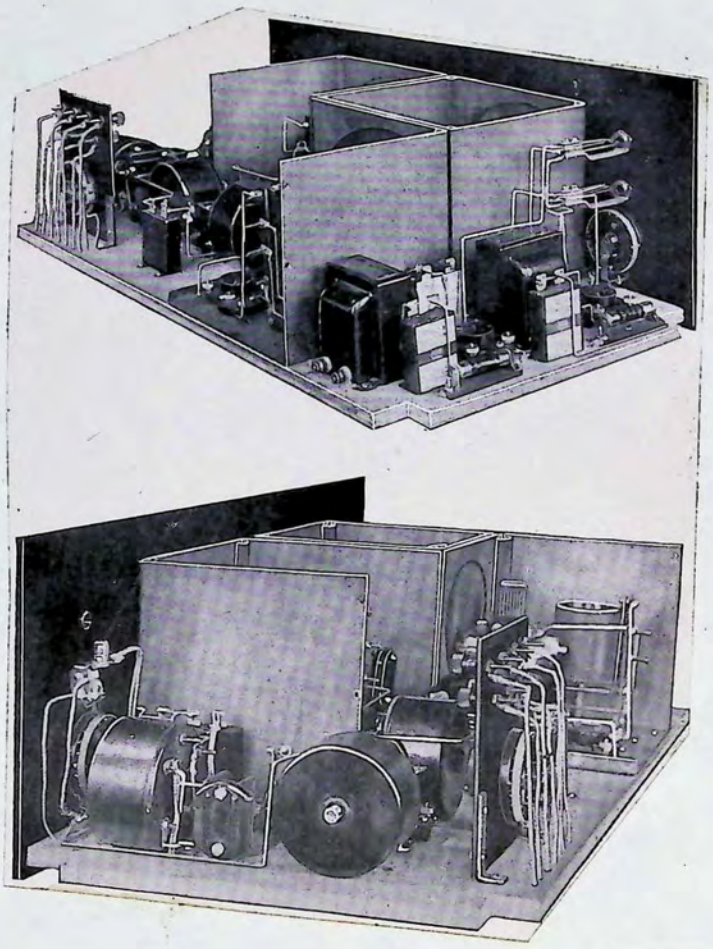


BOTTOM VIEW
RH REAR CORNER

LACAULT's "ULTRADYNE LR-4", 1926: Sht. 8
(Original Power Amplifier)



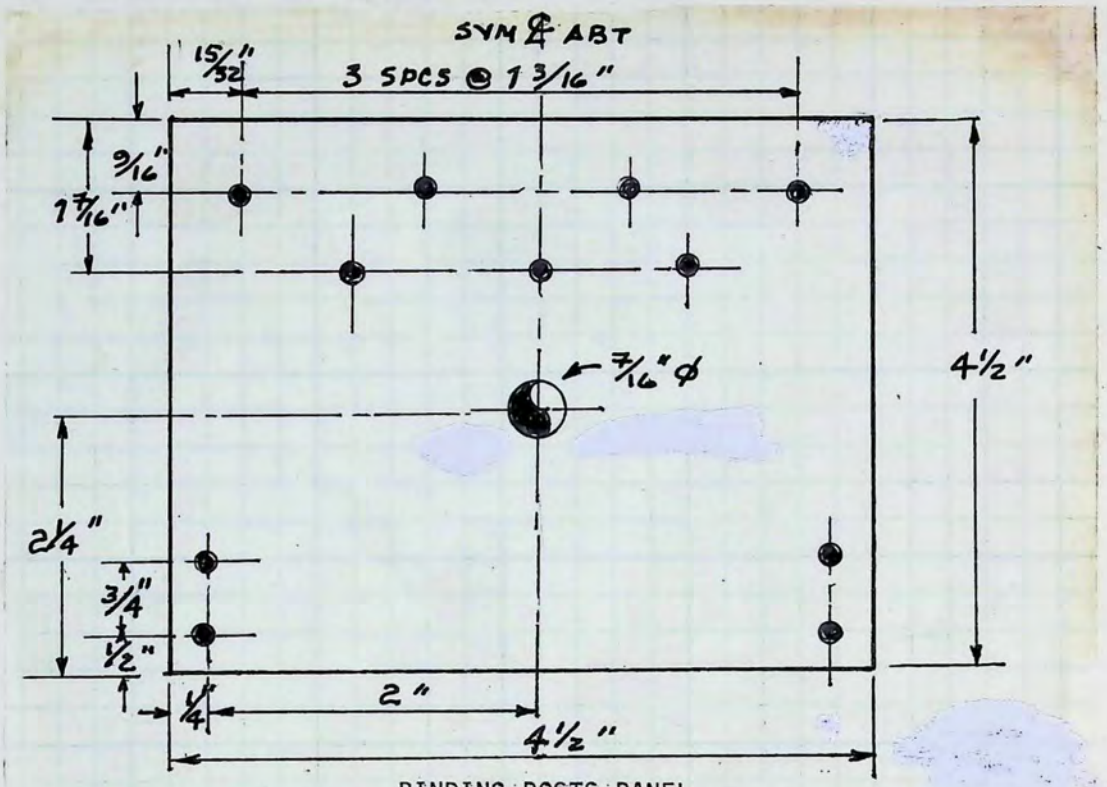
LACAULT's "ULTRADYNE LR-4", 1926: Sht. 9



TUNING THE LR-4

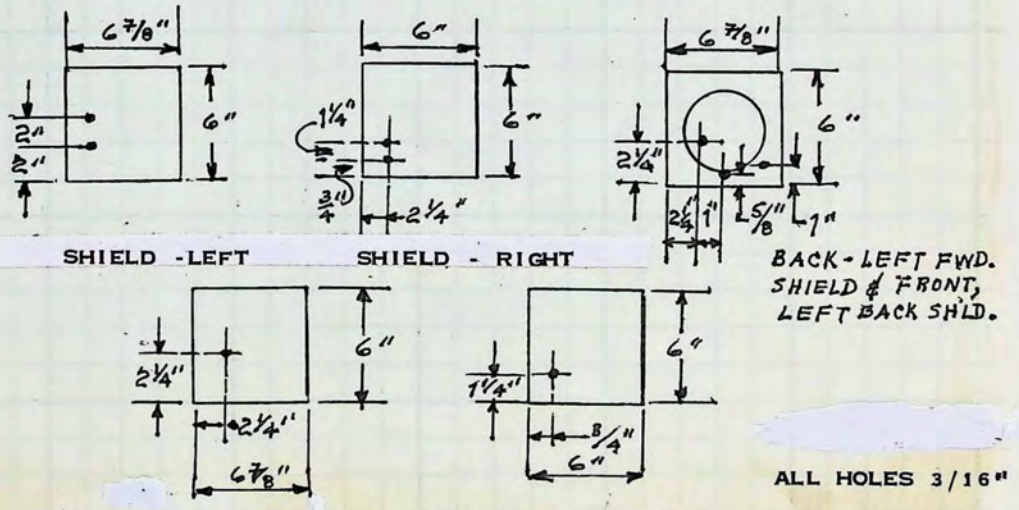
1. Turn rheostats and potentiometers in full until a whisle is heard.
2. Back off potemtiometer until whistle stops.
3. Rotate dials until a signal is heard.
4. If a continuous whistle is heard, check the first tube's "Equaliser" (balancing condenser).
5. Re-adjust rheostats and potentiometer on weak signals.
6. "Equalisers" connected in parallel with left variable should be adjusted for best volume, and left.

LACAULT "ULTRADYNE LR-4", 1926: Sht. 10



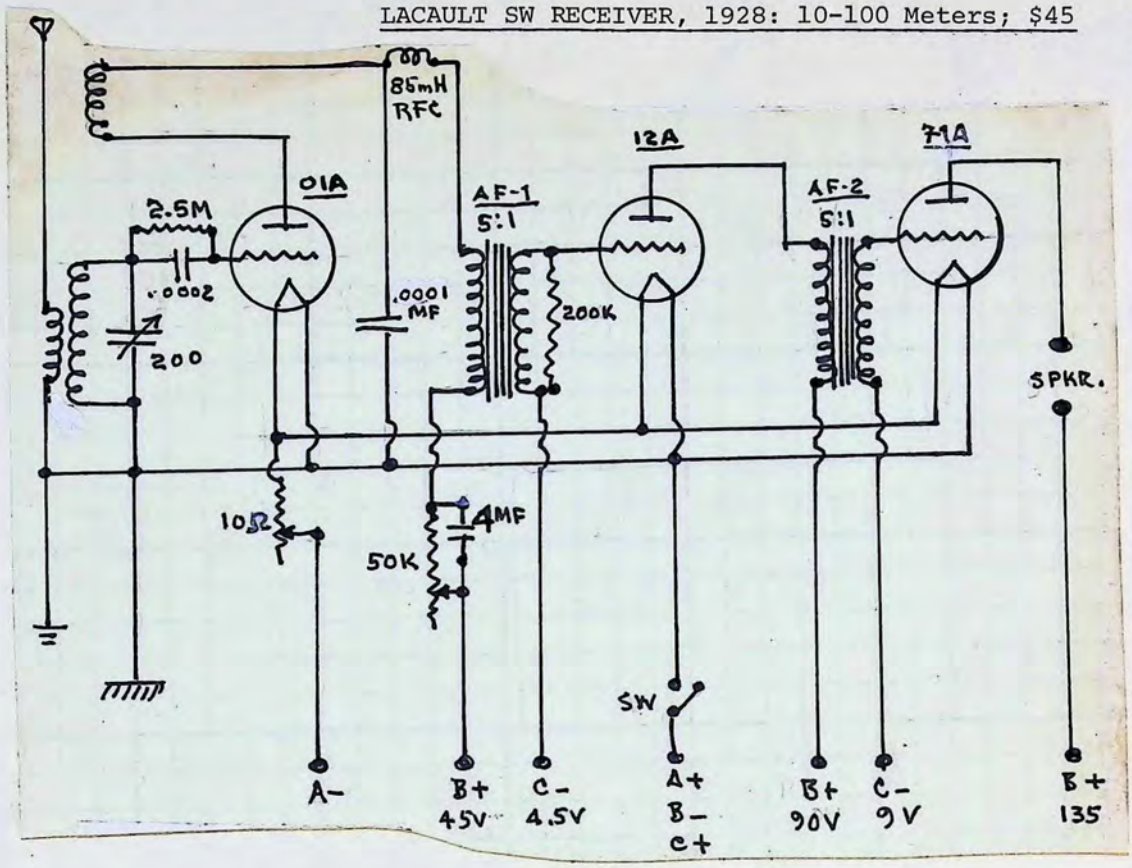
BINDING POSTS PANEL

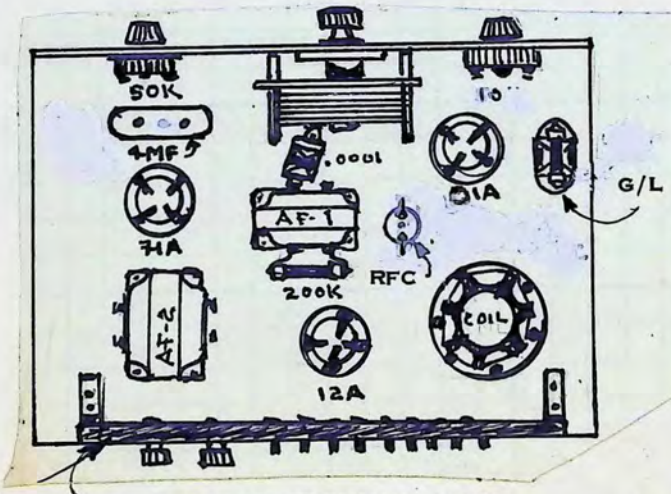
ALL HOLES 5/32" UNLESS NOTED.



SHIELD BOXES DRILLING PATTERN

LACAULT SW RECEIVER, 1928: 10-100 Meters; $45



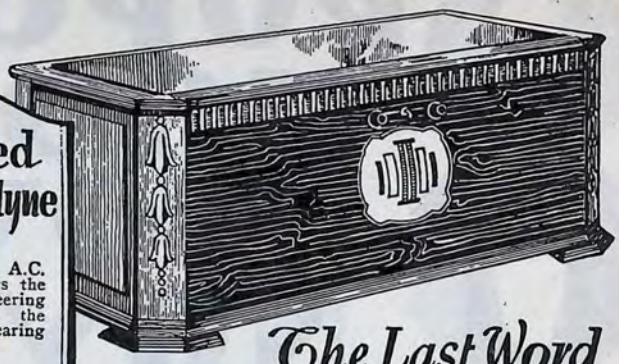


BAKELITE TERMINAL STRIP

ROLLER-BEARING TYPE RHEOSTAT

(RW 12-28)

ULTRADYNE A.C. COMMANDER



A Thoro-Bred Super Heterodyne

The ULTRADYNE A.C. COMMANDER employs the most modern engineering principles backed by the quality products bearing these trade marks.

ELECTRAD
CLAROSTAT
EC
SANGAMO
BENJAMIN
THORDARSON
TYRMAN
Hammarlund
Sovereign
EBY
PARVOLT
LYNCH
CORBETT
BIRNBACH
Carter

The original Ultradyne modulation system, originated by R. E. Lacault, is employed in this new circuit. It is recognized as the most sensitive method of signal reception. It will bring in the weakest signals and step them up to loudspeaker volume. Distance and selectivity are no longer problems when the modulation system is employed. Sensitivity is assured! This new Ultradyne again proves the supremacy of the modulation system, an original Ultradyne development.

The Last Word in Radio Reception.

CLEARER tone, greater distance, unheard of selectivity—these are the final achievements now available in the new Ultradyne A.C. Commander, an all-electric improved super-heterodyne, which has set the whole radio industry agog from coast to coast. If only for its circuit, which employs the original Ultradyne modulation system, this set would hold its own in competition, but it does more than that! It is a thoroughbred in every sense of the word.

Here at last is a circuit that operates on A.C. without hum. It is receptive to the weakest distant signals and brings them in with a volume that is almost uncanny. Coupled with the Ultradyne Power Unit it equals the tone quality of any receiver yet designed.

Complete construction article appears in Summer issue of RADIO LISTENERS' GUIDE AND CALL BOOK.

74 STATIONS IN ONE EVENING

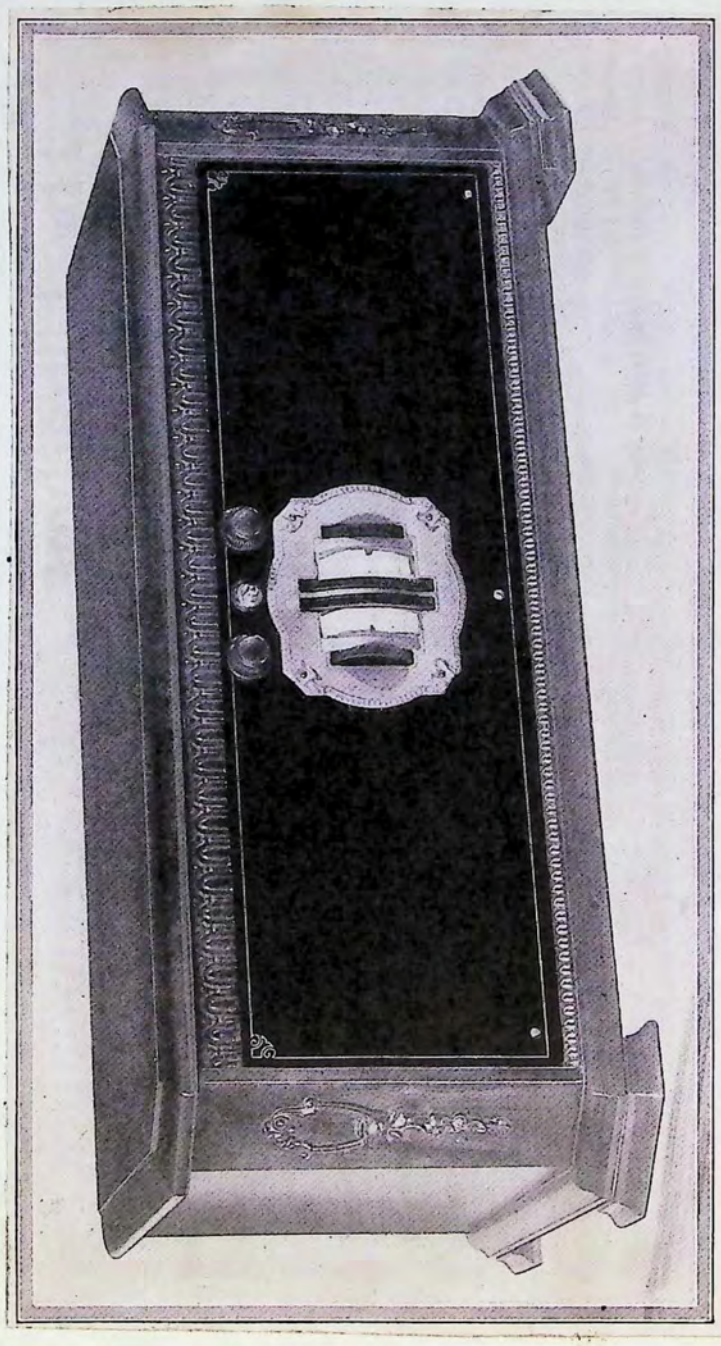
The Ultradyne has an established record for distance which cannot be surpassed. An Ultradyne owner in La Grange, Texas, records reception from 74 stations in one evening—Stations from coast to coast and as far distant as Australia. Nine thousand six hundred miles away!

You can have the utmost in radio enjoyment and a real thrill in the reception of distance if you assemble the Ultradyne A.C. Commander or have your local set builder assemble it for you.

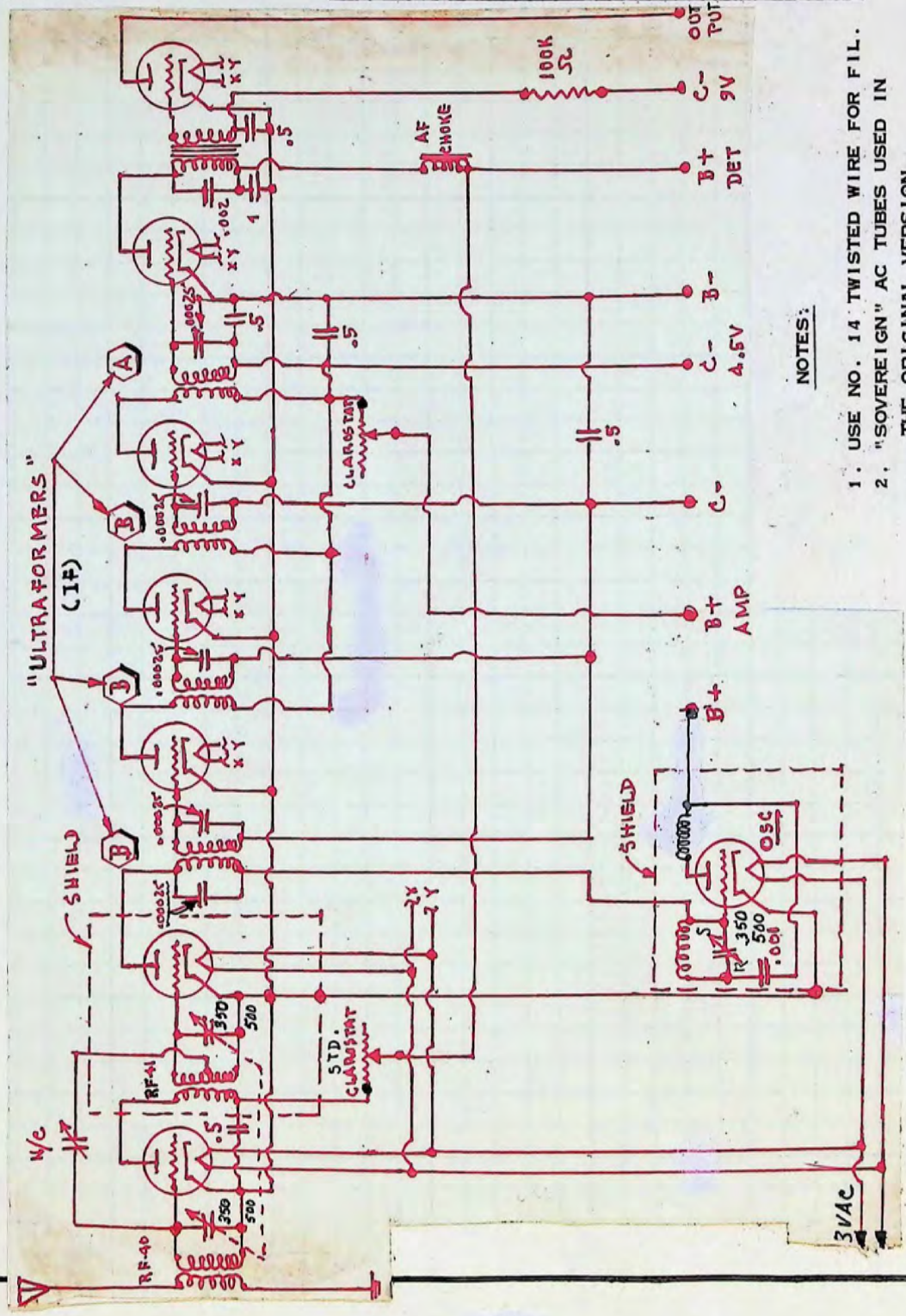
DEALERS AND SET BUILDERS! Write for our proposition. We are exclusive distributors. Parts not available from any other source.

ULTRADYNE SALES COMPANY
509 South Federal Street, Chicago, Ill.

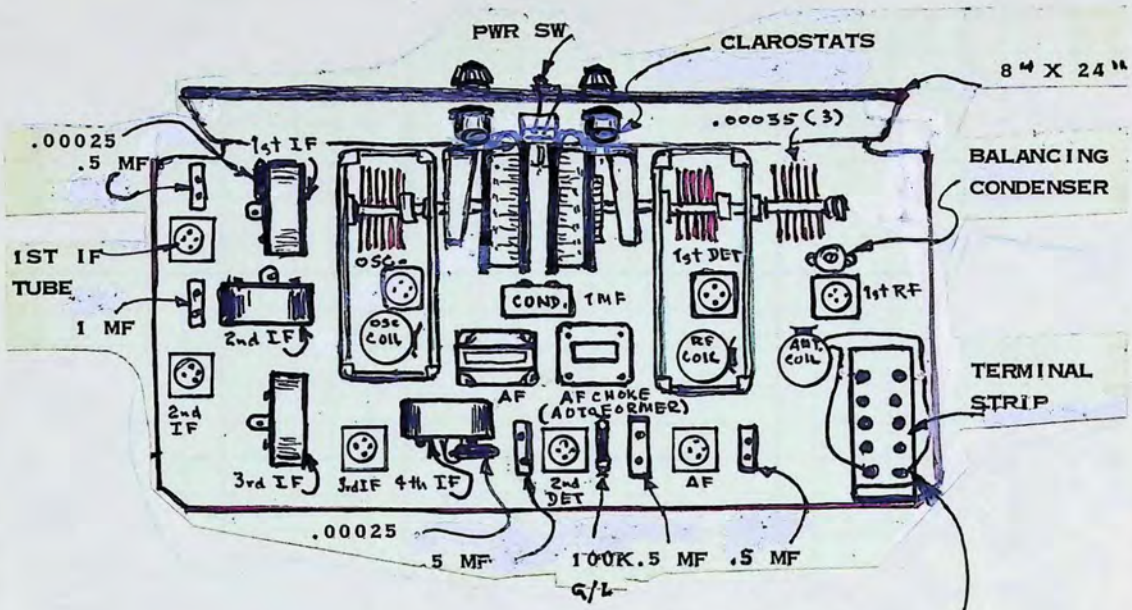
(Sht. 1) LACAULT's "ULTRADYNE AC COMMANDER", 1928



(Sht. 2) LACAULT's "ULTRADYNE AC COMMANDER", 1928



"ULTRADYNE AC COMMANDER", 1928: Sht. 3



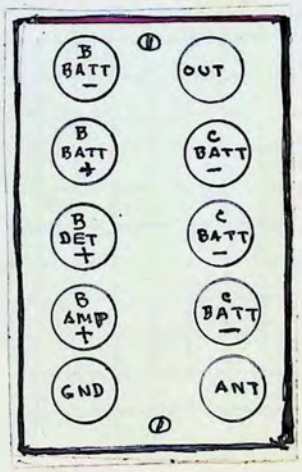
"Ultraformers" Resonance = 2,650 Meters.

PRINCIPLE PARTS

(2) Tyrman Drum-Dials.
Thordarson "Autoformer".
Hammarlund 350 mmf Variables (3).
Hammarlund Aluminum Shields.
Hammarlund Couplings (3).
Clarostats (2) Standard.

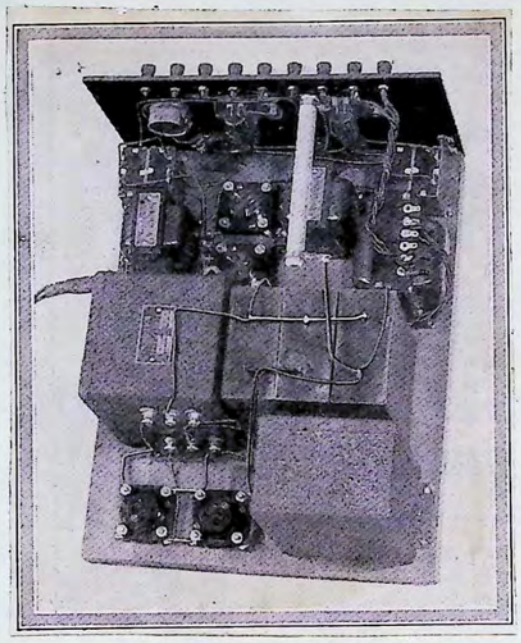
Panel = 8" x 24" x 3/16"

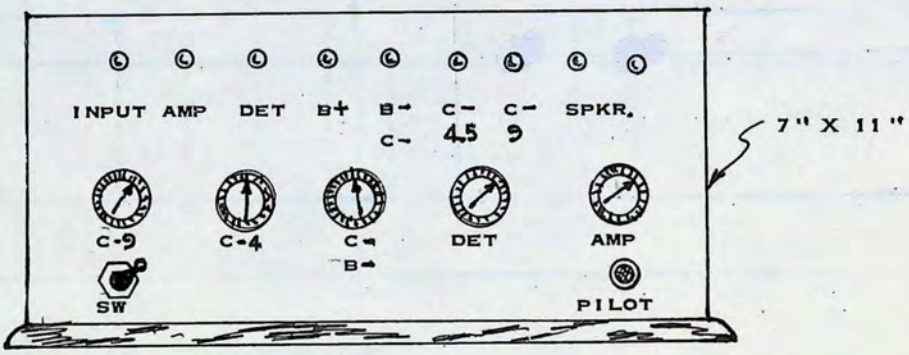
Baseboard = 12" x 25½" x 5/8".



TERMINAL STRIP

"ULTRADYNE AC COMMANDER" POWER SUPPLY, 1928: Sht. 4

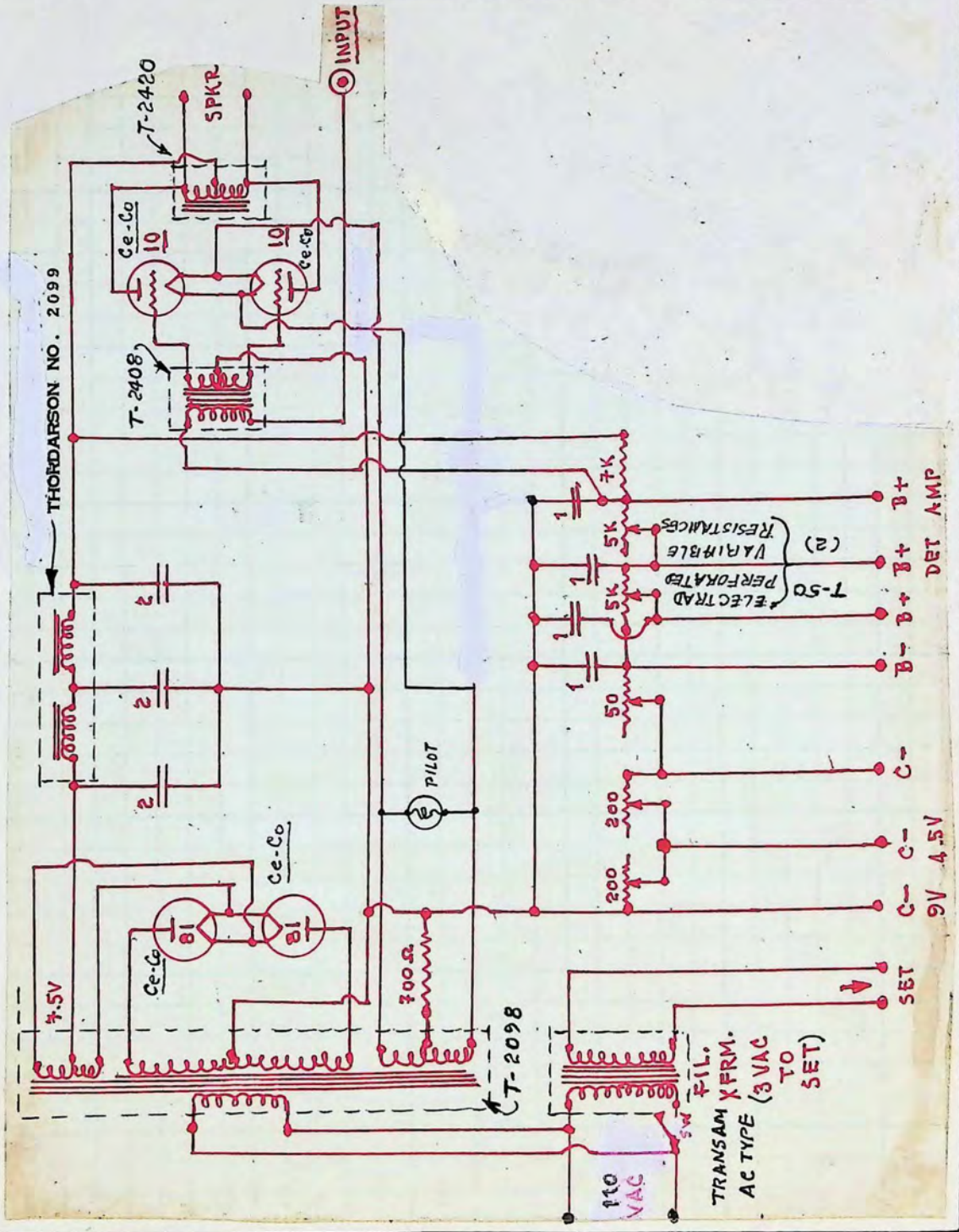




CONTROL PANEL

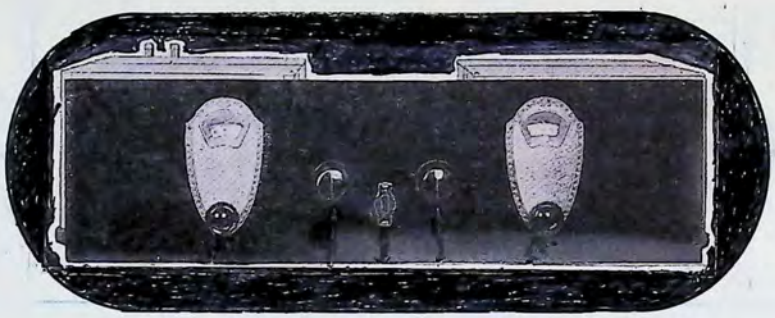
Like most of the better B-eliminators of the late Twenties, Lacault's unit shown here may be used with most any other radio of the period. The only caution would be to stick with the Thordarson, Trans-Am, and Electrad components - they do make a difference.

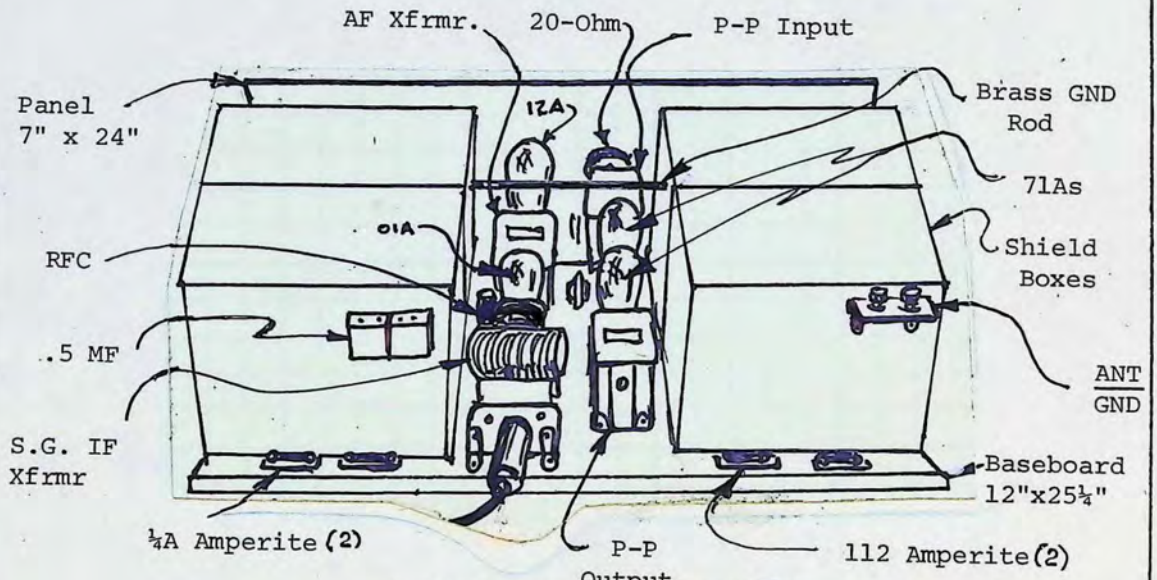
(Sht. 4) "ULTRADYNE AC COMMANDER" POWER SUPPLY, 1928

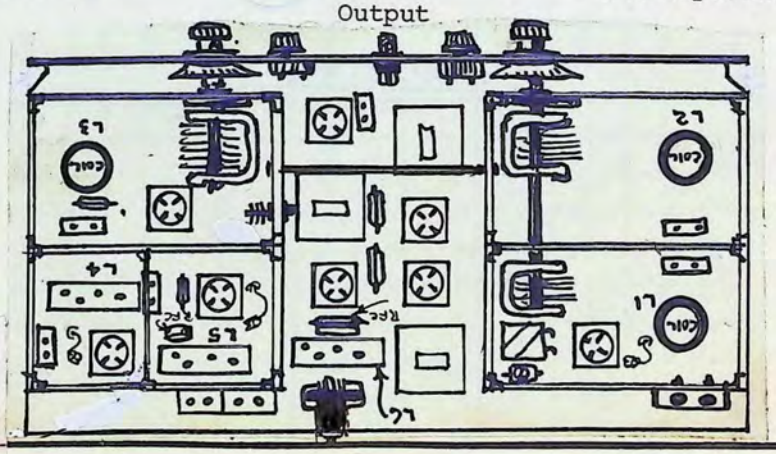


(Sht. 1)

LACAULT's 1928 SCREEN-GRID "STROBODYNE"



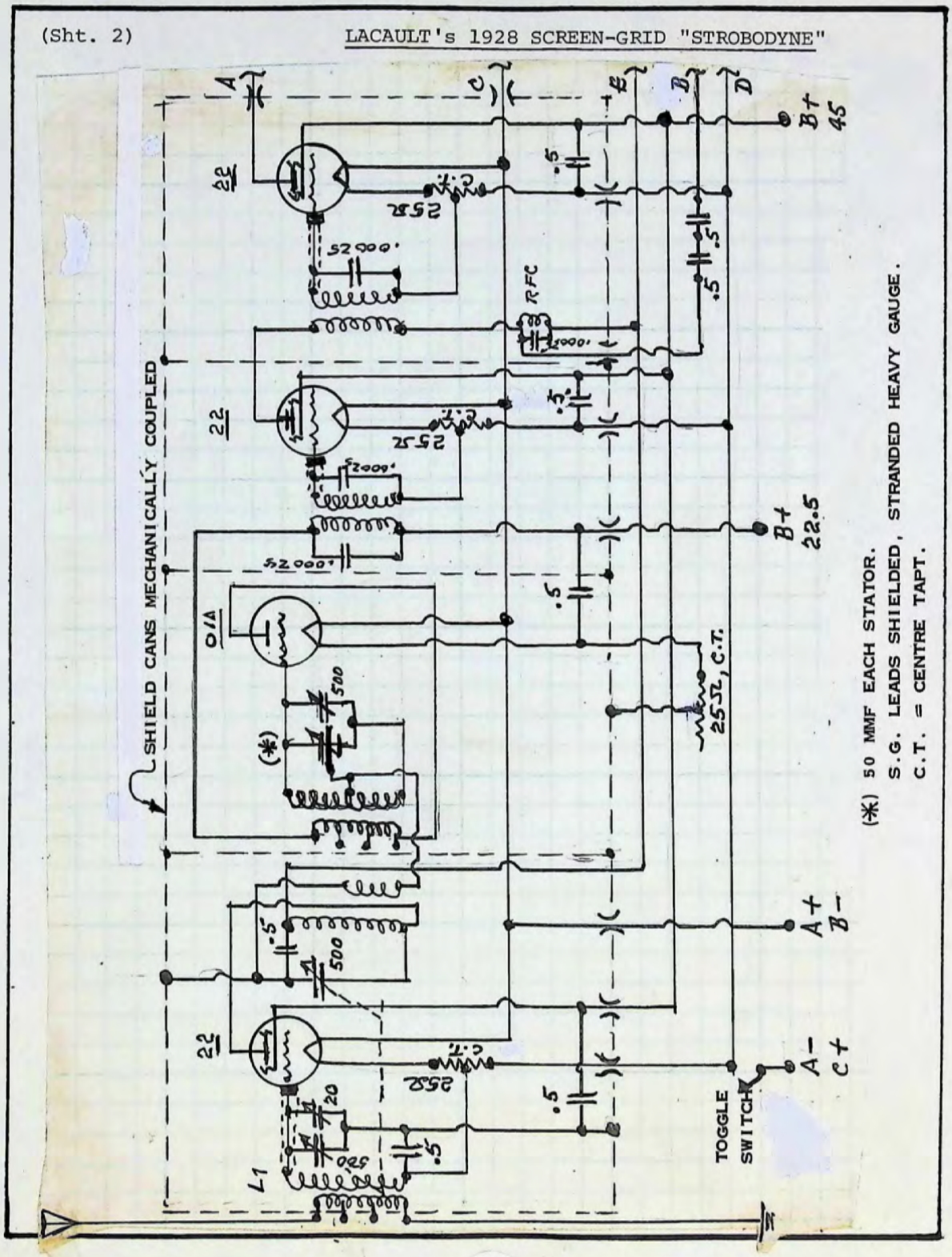




(RW 11-24-27)
(RW 11-17-27)
(RN 9-28)

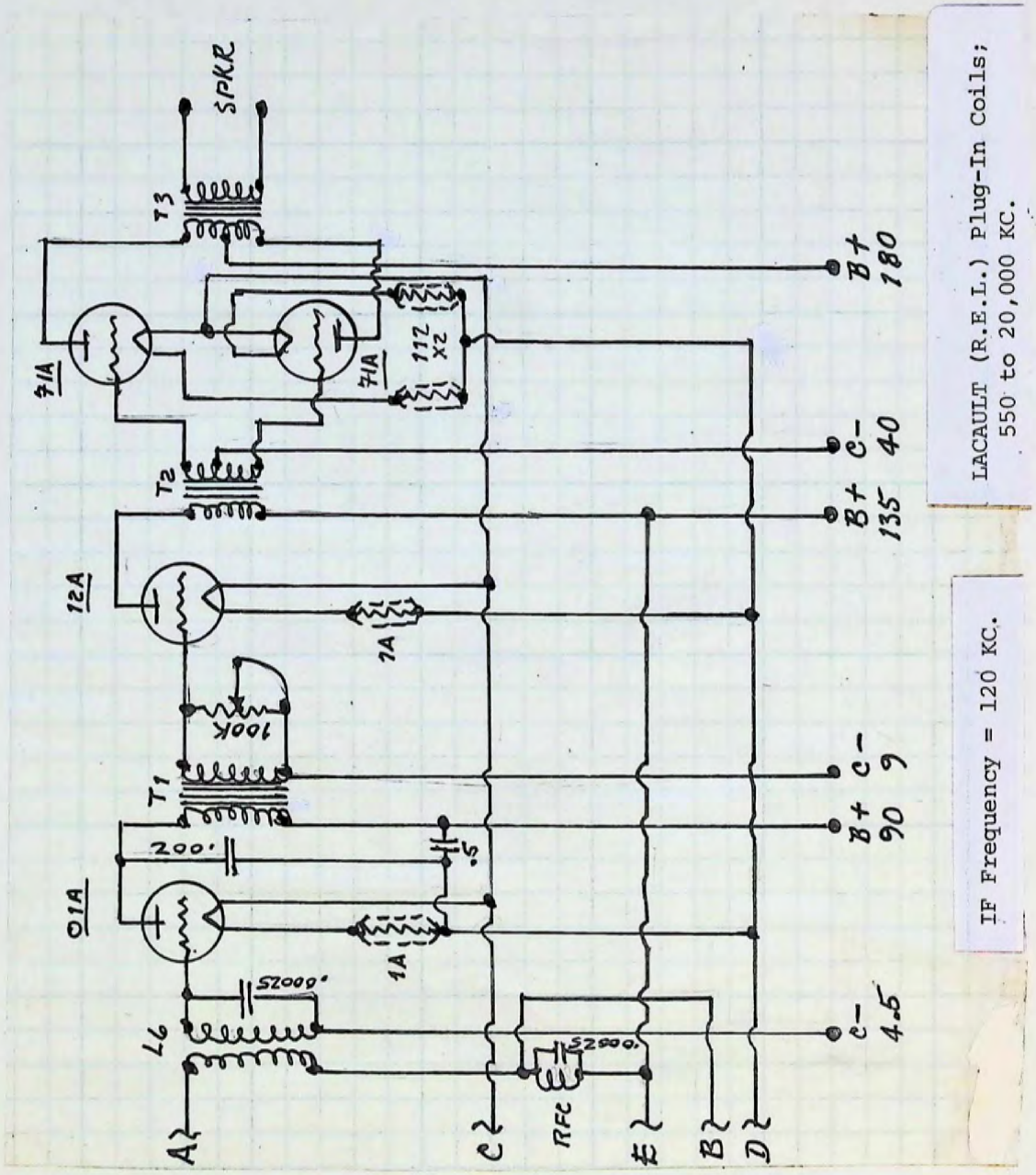
(Sht. 2)

LACAULT's 1928 SCREEN-GRID "STROBODYNE"



(Sht. 3)

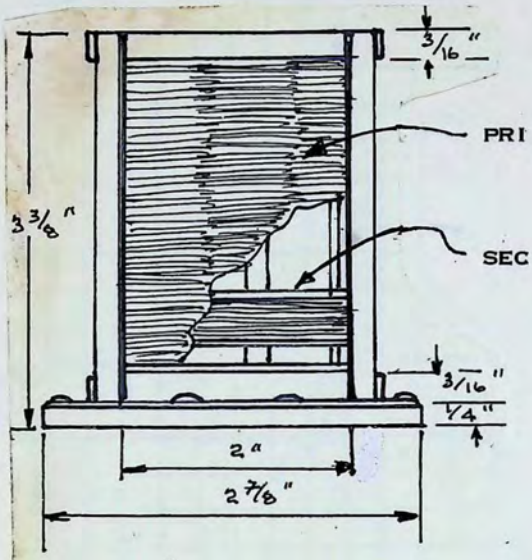
LACAULT's 1928 SCREEN-GRID "STROBODYNE"

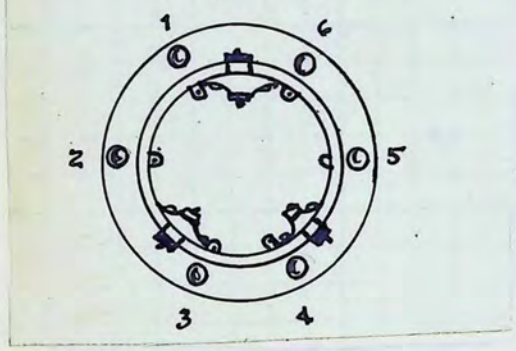


LACAULT (R.E.L.) Plug-In Coils;
550 to 20,000 KC.

IF Frequency = 120 KC.

LACAULT's 1928 "STROBODYNE"; Sht. 4





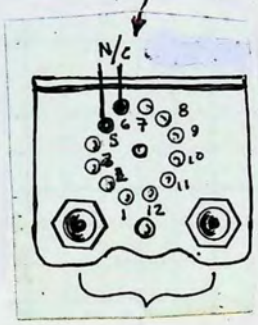
COIL DATA - L1, L2, L3

PRI - 12 TURNS NO. 28 DSC, TAPT EVERY 4 TURNS, EACH TURN BROUGHT OUT TO LUGS 1,2,3,4.

SEC - L1, L2 - 76 T., NO. 22 DSC.

SEC - L3 - 68 TURNS NO. 22 DSC, TAPT AT THE CENTRE, WOUND IN SAME DIRECTION AS PRI. START BROUGHT TO LUG 5 AND END AT LUG 6.

FOR 71A IF USED

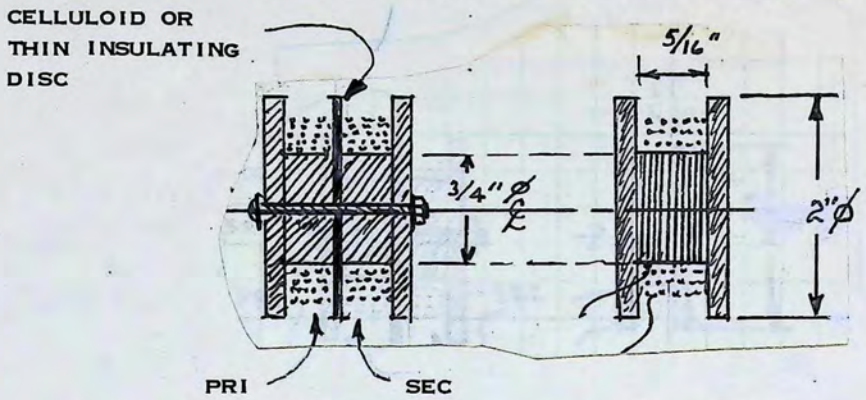


SPKR. JACKS

POWER PLUG BRKT. ON BASEBOARD

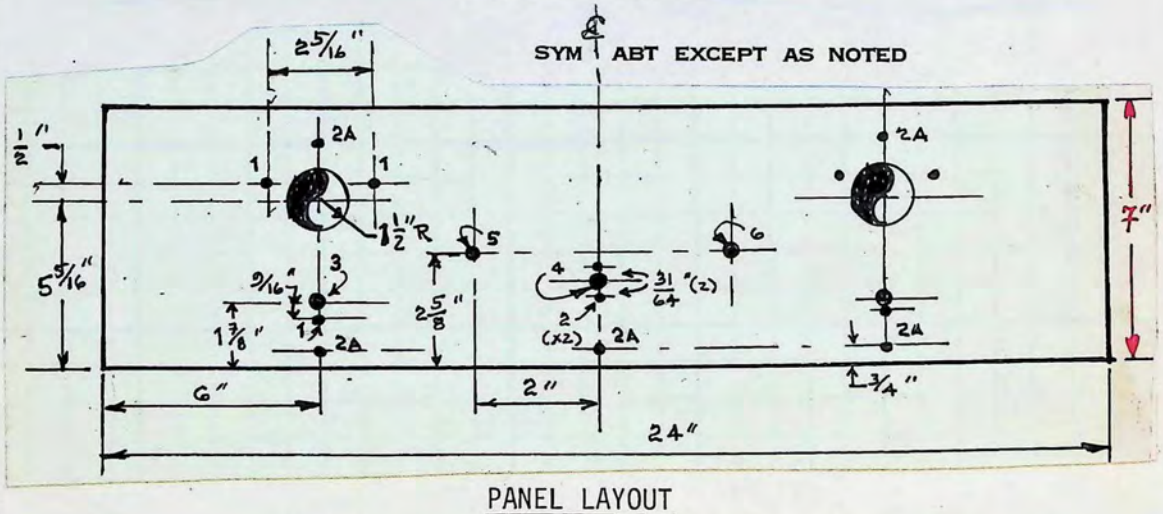
Miscellaneous Hardware: #16 Gauge Buss-Bar, 20'.
Spacers 1" Lg. (9).
Brackets for RFC.
40' Flexible Hook-up Wire.
Bakelite Rod 4" x ¼"ø.
Extension Shaft 10" x ¼"ø.
Insulated Mntng. Plate for Variables, 1¼" x 2¼" x 3/16".
112 Amperite for 71A Tube.

LACAULT's 1928 "STROBODYNE"; Sht. 5



L4, L5, L6	L7, L8, RFC
PRI = 475 T, NO. 30 SSC ENAMELLED	475 TURNS WOUND IN LAYERS
SEC = (SAME AS PRI)	BOBBIN SAME SIZE FOR EACH.

COIL BOBBIN DETAILS

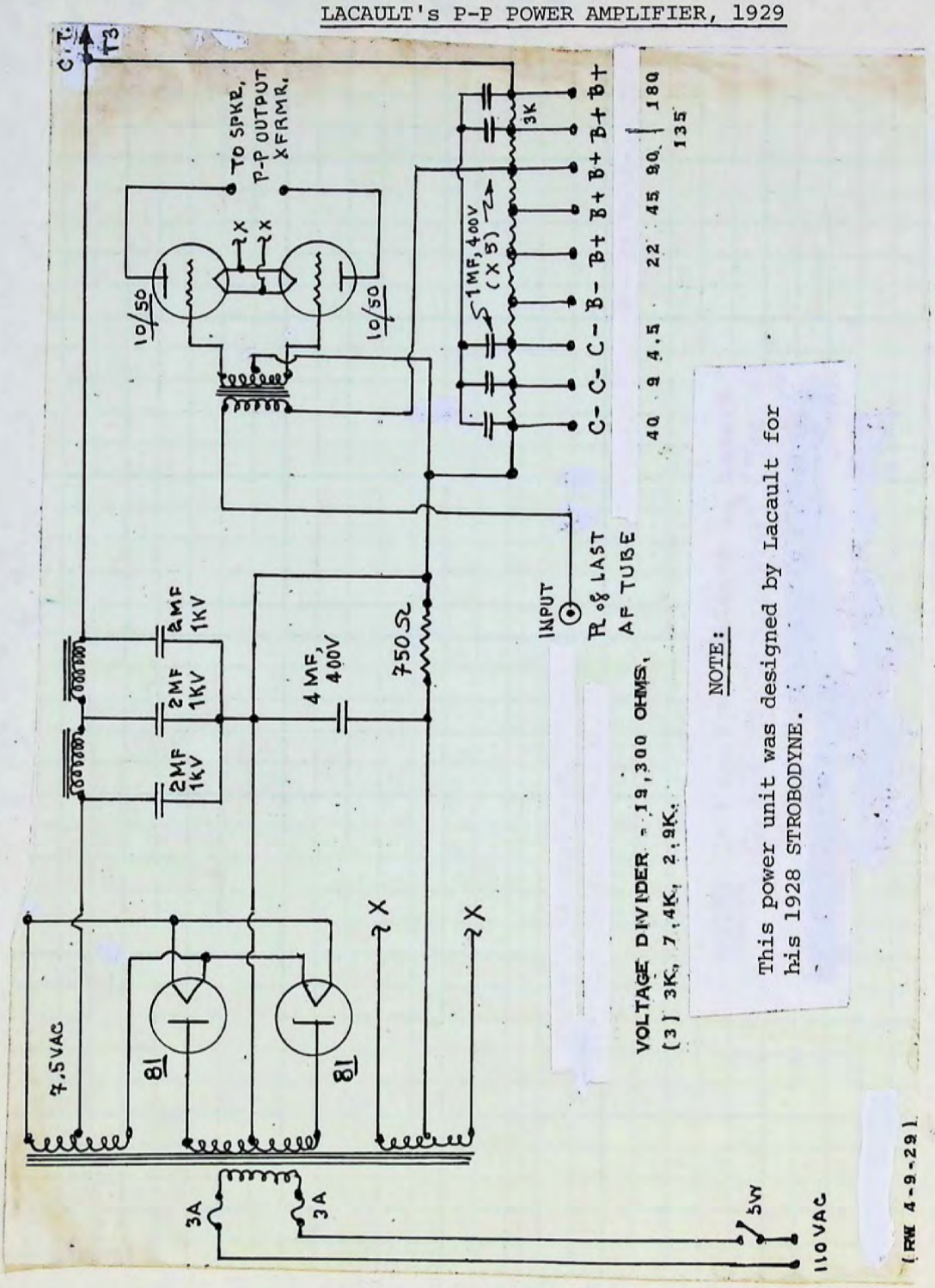


PANEL LAYOUT

HOLE DIAMETERS (ALL 2A HOLES TO BE CSK.)

1. 1/8"	2. 5/32"
3. 3/8"	2A - 5/32"
4. 9/16"	5. - 5/16"
6. - 3/8"	

LACAULT's P-P POWER AMPLIFIER, 1929



(Sht. 1)

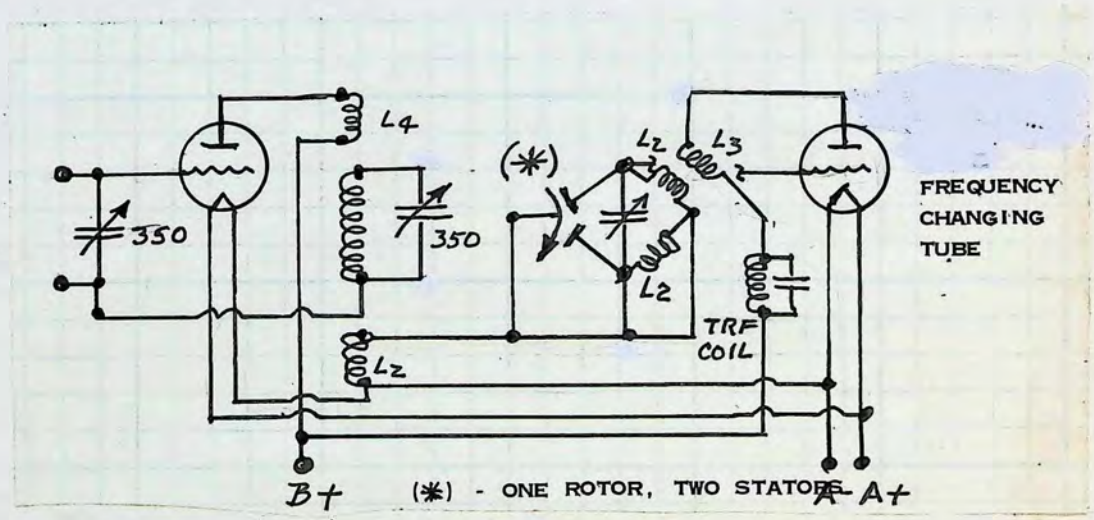
LACAULT's "STROBODYNES"

Lacault was one of the few early radio engineers who could read in several languages, other than American-English, which may have accounted for his interest in checking-out foreign circuits.

Parenthetically, it might be mentioned that Blan-the-Radio Man of Cortland Street, imported foreign radio media, and spoke a variety of seven languages; he also knew Lacault.

It was reading the proceedings from the French Academy the frequency-changing concept was first enunciated, and Lacault immediately began playing with the concept for an American version. The result was known as the *"STROBODYNE"*. Lacault designed a 1927 and a 1928 version, the latter rather elabourate, and heavy. Both circuit designs are detailed hereinafter.

As an aid to what follows, the original concept of Lucein Chretien, of the French Academy, is sketched below:



STROBODYNE

The STROBODYNE circuit was originally designed by Lucien Chretain of Paris, and was adapted for the U.S. fraternity by Robt. E. Lacault in 1927.

While the STROBODYNE can be likened to the conventional super-het, it was't, really, as the principle for the frequency changer was radically new. The principle was based on the familiar Stroboscope for checking the speed of revolving objects, such as a phonograph recording, hence the name. Instead of employing the usual oscillator tube feeding an oscillating current into the first DET tube in order to create a beat-note with the incoming signal frequency, the STROBODYNE used a single tube, also oscillating at radio ferquency, the tube taking the place of both the first DET and OSC of the conventional super-het.

The action of the STROBODYNE borders upon the super-regeneration. In operation, the amplification takes place only when the grid of the tube is of negative value. When the grid goes positive, the grid-to-filament resistance is exceeding low and amounts to a short-circuit across the grid coil, thus no amplification takes place. In other words, excessive regeneration is obtained through each negative half of the cycle.

When the tube reaches the point of oscillation a beat-note is created, the frequency of which is dependent upon the frequency of the signal being received. From that point on, the STROBODYNE functions pretty much as the conventional super-het.

The bridge-balancing condenser may be considered as a semi-critical item. If you are not employing the specified CArdwell compensating variable, similar configurations by other manufacturers may be used - the "butterfly" condenser by Daven, for example. But if the capacity is too large, the tuning range of the oscillator will be limited. The Cardwell variable was approximately 30 mmf for each stator; the capacity of the condenser , with the rotor set at mid-point, would be the normal setting.

To adjust the balancing condenser, proceed as follows:

1. Tune in a loud signal or station.
2. Turn out (OFF) the rheostat for the first tube, but leave the tube in its socket. There may some signal shift.

3. Place volume control at MAX, and rock the residual signal or noise until it is as loud as it can get.
4. Adjust the balancing condenser until the volume is minimal or disappears completely.
5. The stage is then neutralised. This method can be used with either old style or later style tubes of the same series. If the old type is used (glass envelop with an evacuation tip on the top) wrap a piece of paper around one prong of the FIL prongs before inserting the tube. Be sure to remove the paper after balancing the oscillator coil!

When a 12A is used in the first AF, an output filter is not necessary, and a speaker may be connected directly into the Plate circuit of that tube. Lacault used two output filters - Muter and Interstate. The latter is easier to connect, as the former requires a three-leaf jack, that can cause trouble.

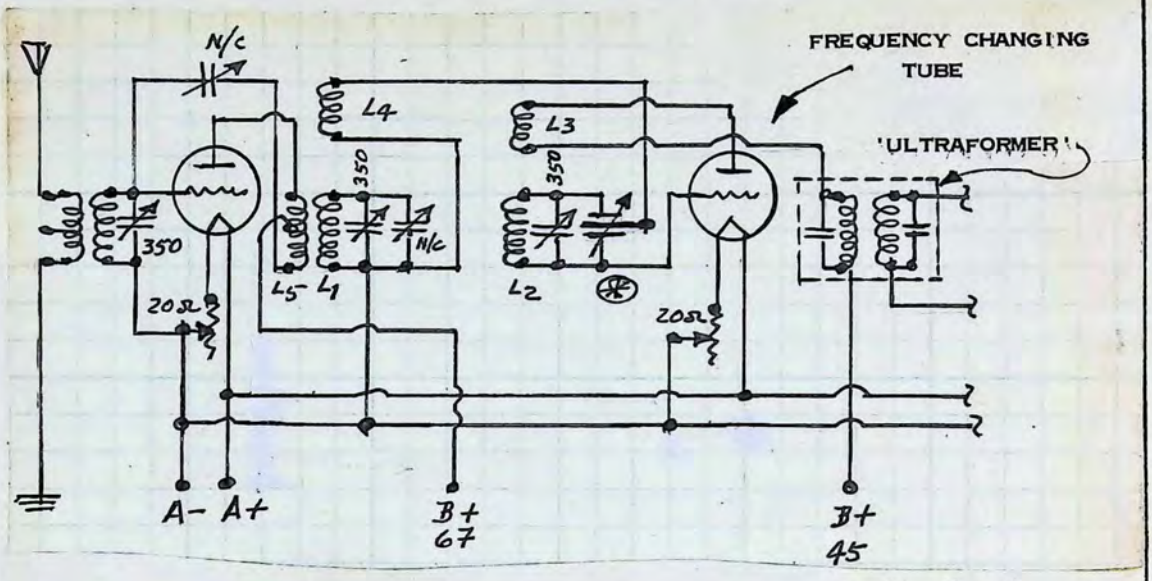
A loop can be utilised by removing or disconnecting the ANT coil, and connecting the loop to the SEC connections of the ANT coil. That is, to the stator of the first variable. Introduction of a loop may cause the first tube to go into oscillation at the lower wavelengths, and it may be necessary to neutralise that stage again.

The Strobodyne

NEVER, since the basic principles involving superheterodyne construction were first conceived, has there been a greater circuit than the STROBODYNE. The STROBODYNE takes its name from the Stroboscopic Phenomena, on the principle of which it was developed. The French inventor of the STROBODYNE, Lucien Chretien, and this country's greatest authority on superheterodyne construction, R. E. Lacault, have co-operated in introducing this remarkable receiver to the American radio public.

Leading engineers of the radio industry have called the STROBODYNE the greatest of superheterodynes. The STROBODYNE reaches out for the distant stations, locates them and brings them in with such clariety and ease that only by actual operation of this remarkable receiver can you fully appreciate its efficiency. Marvelously clear and faithful tone reproduction is just another feature of this wonderful set. Those radio fans who lean to the superheterodyne as the acme in radio receiving circuits will find in the STROBODYNE the culmination of all their ideals.

LACAULT's 1927 "STROBODYNE"; Sht. 1



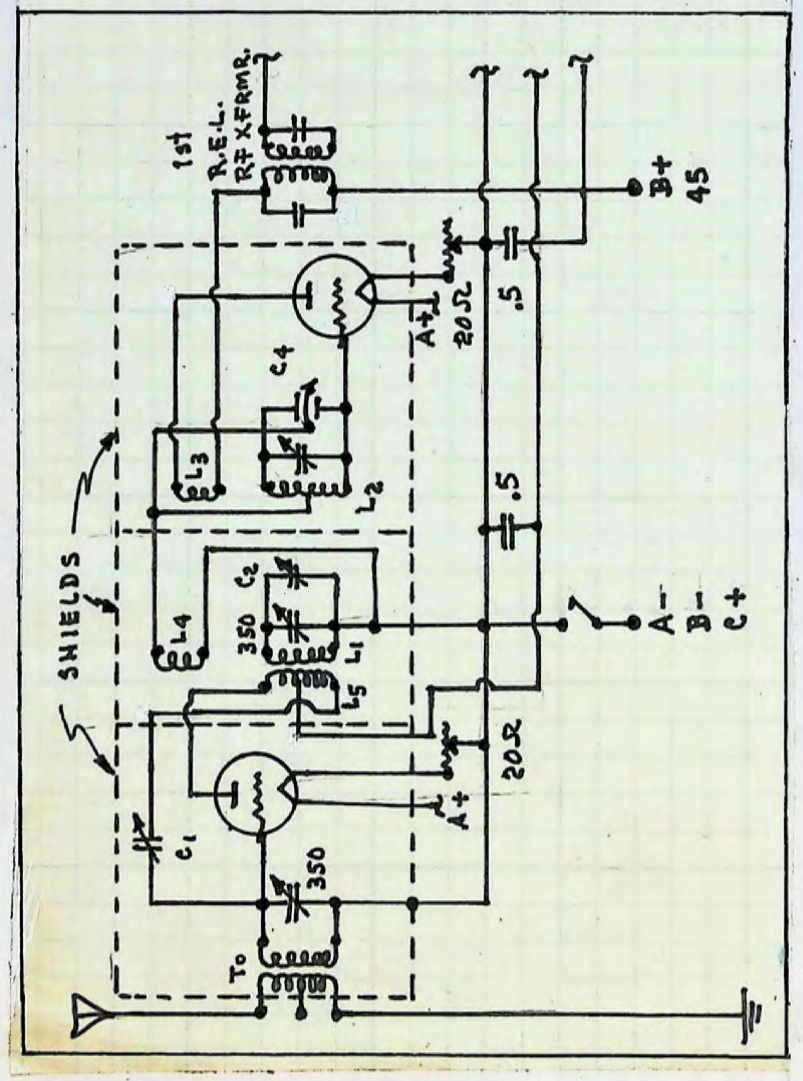
(✳) = 1 ROTOR, 2 STATORS. (SHIELD CANS NOT SHOWN.)
COIL NUMBERS CORRESPOND TO CHRETIEN'S.

LACAULT's ADAPTATION OF CHRETIEN's THEORY

Lacault's *"Strobodynes"*, while obviously a radical departure from then-current thinking and practices, was interesting on several counts. First off, they were the first circuits that he designed after leaving Gernsback which did not specify Phenix or R.E.L. components. He did specify his own plug-in coils, which were always something special with him.

You will also note his introduction of one dual stator, single rotor variable, 50 mmf each stator. This was a "balancing-condenser" for the first two stages. Such variables were special, and instructions were given for making-up one from a "butter-fly" variable, although that designation did not come into vogue until the mid-Thirties.

The 1927 *"Strobodyne"* of Lacault is easy to construct.



To = Hammarlund Auto-Coupling Coil.

L1, L4, L5 = Hammarlund Special Autocplr.

L2. L3 = Hammarlund Regular Autocplr.

C1, C2 = Balancing Condensers.

C4 = Cardwell Dual Stator, Single Rotor Variable.

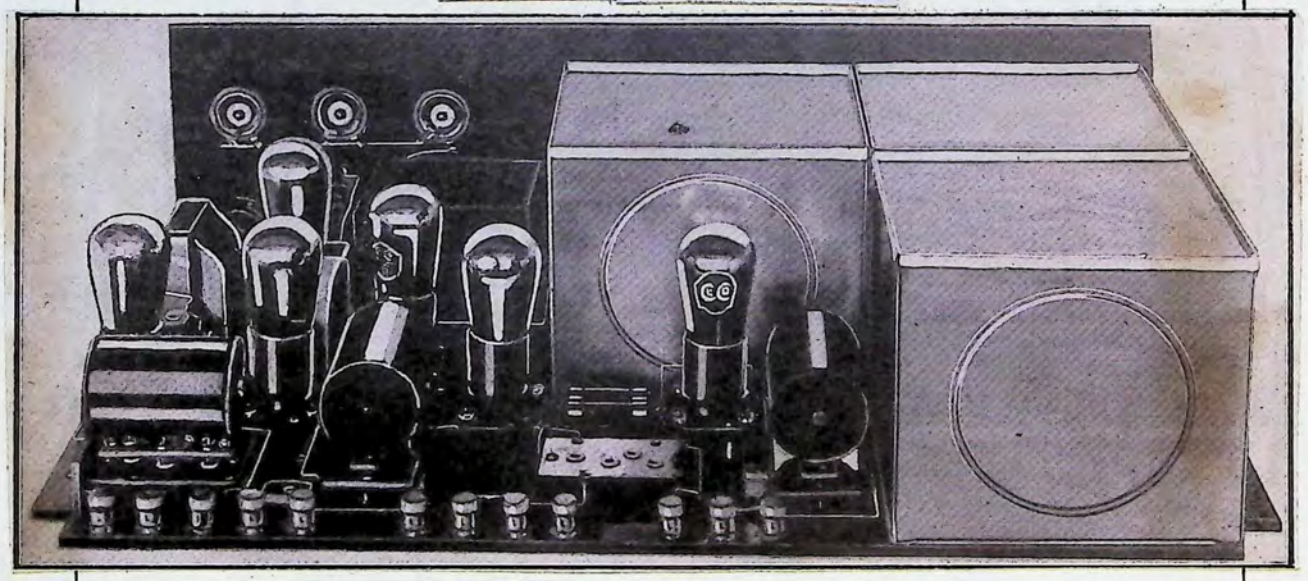
LACAULT's 1927 "STROBODYNE; Sht. 2

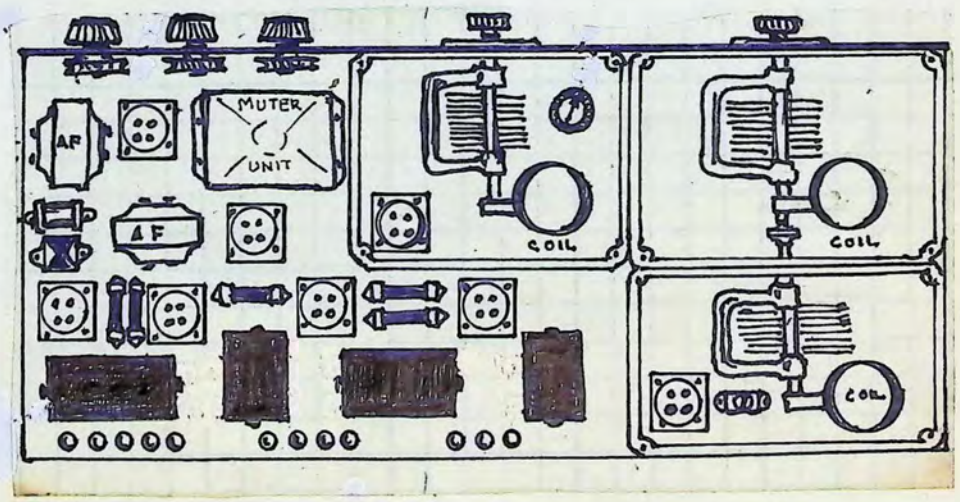
LACAULT's PRACTICAL APPLICATION OF CHRETIEN's THEORY

You might want to compare this with the initial sdaptation notes made by Lacault. The above application was applied to both the 1927 and 1928 versions of the "Strobodyne", with minor modifications, shown elsewhere in this Monograph.

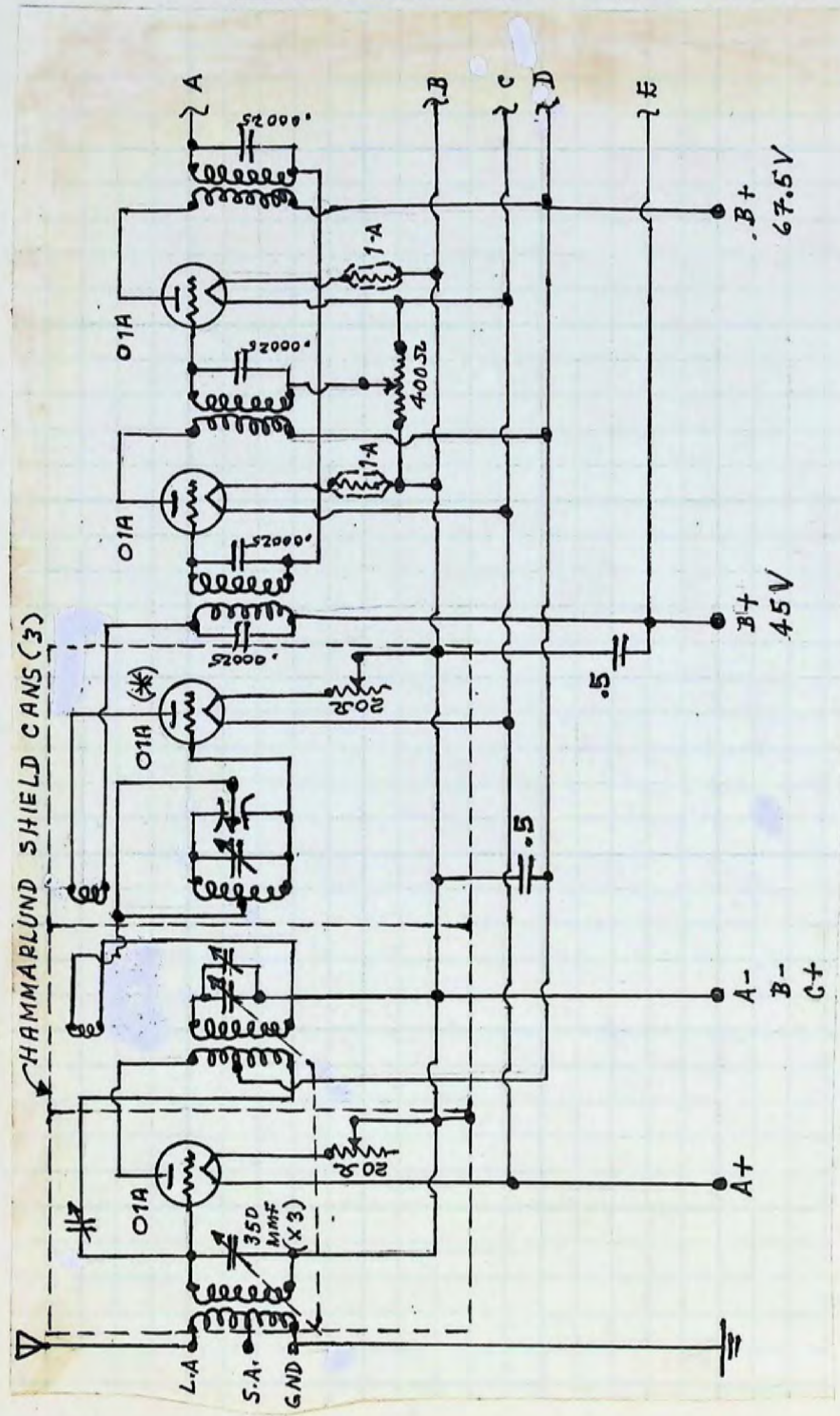
(Sht. 3)

LACAULT's 1927 "STROBODYNE"



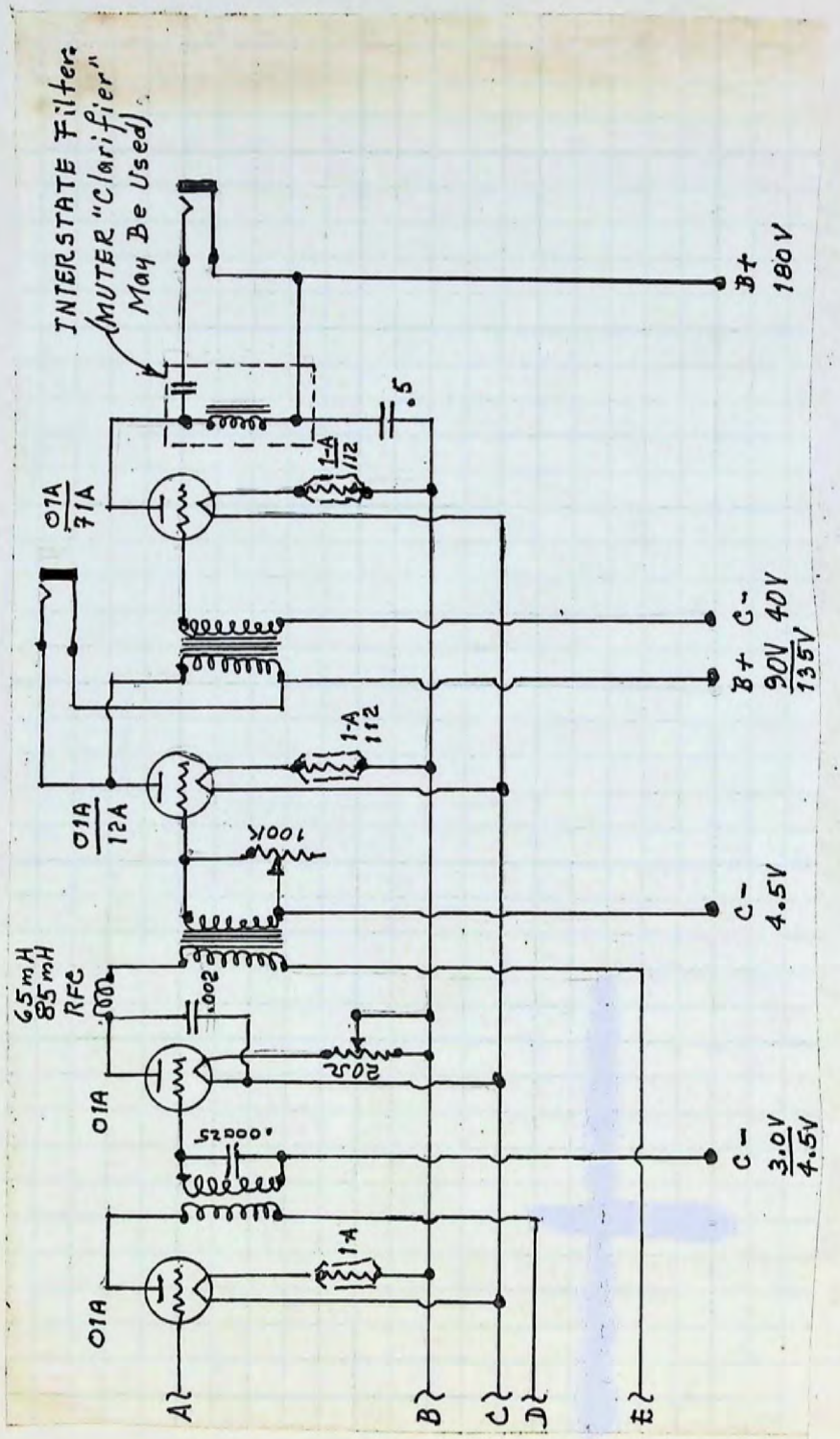


1927 "STROBODYNE" CLARIFICATION DETAILS; Sht. 1



(*) - OSC & FREQUENCY CHANGER.
SHIELD CANS MECHANICALLY COUPLED & ELECTRICALLY COUPLED.
ALL TUBES WERE CE-CO "E" (01A).
PANEL 8" X 24"
SUB-PANEL 12" X 25" X 1/4".

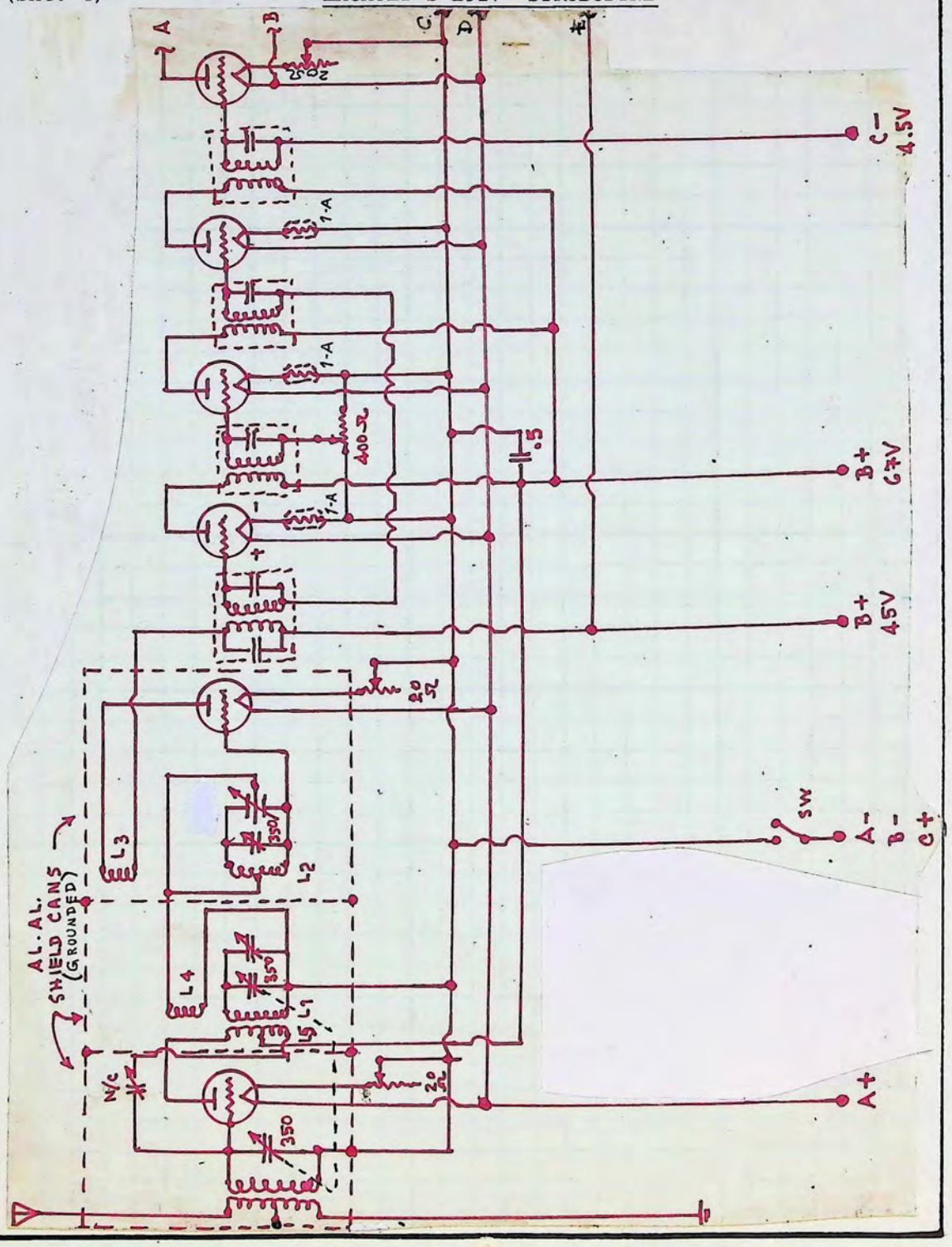
(RW 9-17-27)



PRINCIPLE PARTS

1. SAMSON 'SYMPHONIC' AF XFRMRS (OR GEN-RAD 285D & 285L).
2. CALDWELL 'EQUALIZER' VARIABLE - 2 STATORS, 1 ROTOR.
3. HAMMARLUND 'BALANCING CONDENSERS' (2).
4. ELECTRAD 100K RHEOSTAT - CARTER 400-OHM POT.
5. BENJAMIN UX SOCKETS (8).
6. X-L PUSH-TYPE BINDING POSTS (12).
7. FRITTS CABINET USED ORIGINALLY.

(Sht. 4) LACAULT's 1927 "STROBODYNE"

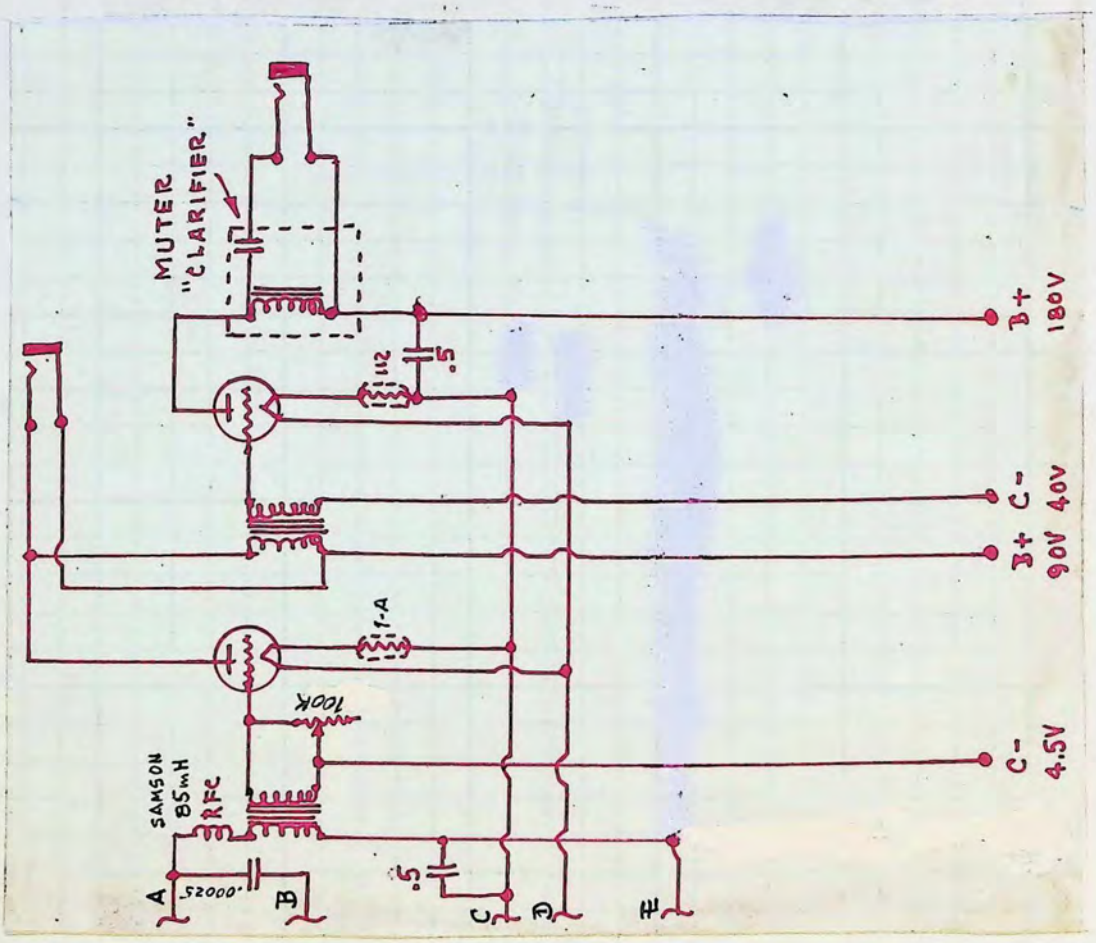


(Sht. 5)

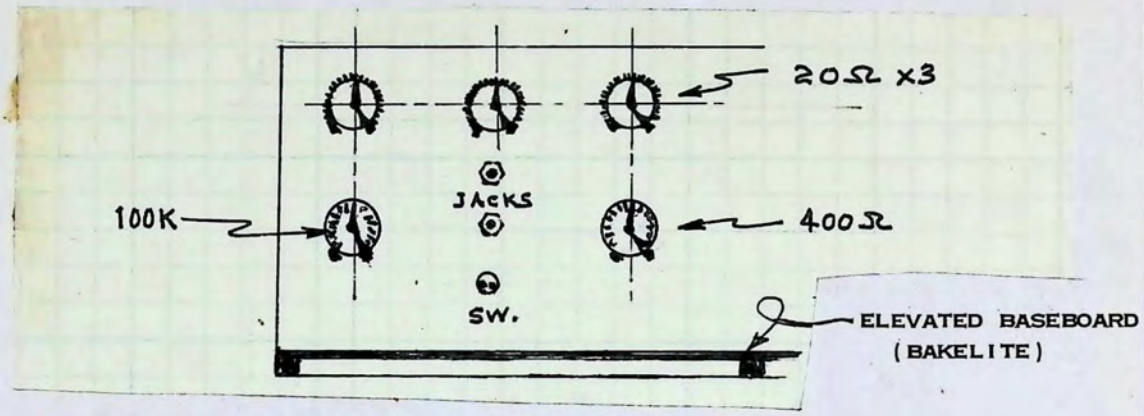
LACAULT's 1927 "STROBODYNE"; Sht. 5

GENERAL NOTES

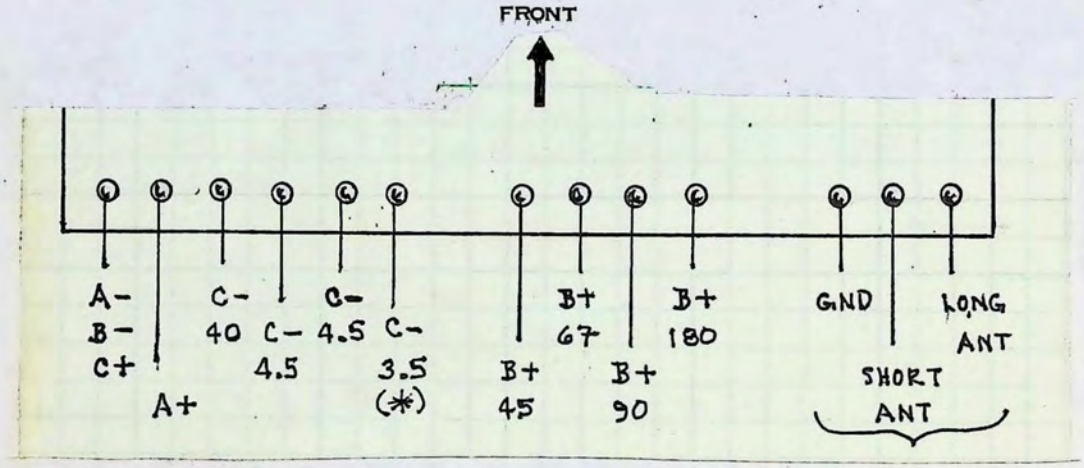
1. CE-CO TUBES USED THROUGHOUT.
2. HAMMARLUND 350 MMF VARIABLES.
3. CARTER JACKS AND RHEOSTATS.
4. GEN-RAD 285D & 285L AF XFRMRS.
5. L1, L4, L5, ONE SPECIAL HAMMARLUND 'AUTO-COUPLER' COIL.
6. L2, L3 ONE REGULAR HAMMARLOUND 'AUTO-COUPLER' COIL.
7. PANEL 8" X 24" X 3/16".
8. .002 MF FIXED CONDENSER.
9. 12 X-L BINDING POSTS.
10. AMPERITES AS NOTED.
11. 01A (7) & 12A OR 71A.
12. (3) .5 MF BY-PASS CONDENSERS.
13. SUB-PANEL 12" X 25" X 1/4". (MICARTA USED ORIGINALLY.)
14. MUTER 'CLARIFIER' OUTPUT UNIT.
15. LACAULT PLUG-IN COILS (4).
16. HAMMARLUND SHIELD BOXES (3).
17. DUAL STATOR-SINGLE ROTOR VARIABLE.



LACAULT's 1927 "STROBODYNE"; Sht. 6



REAR VIEW OF PANEL DETAILS

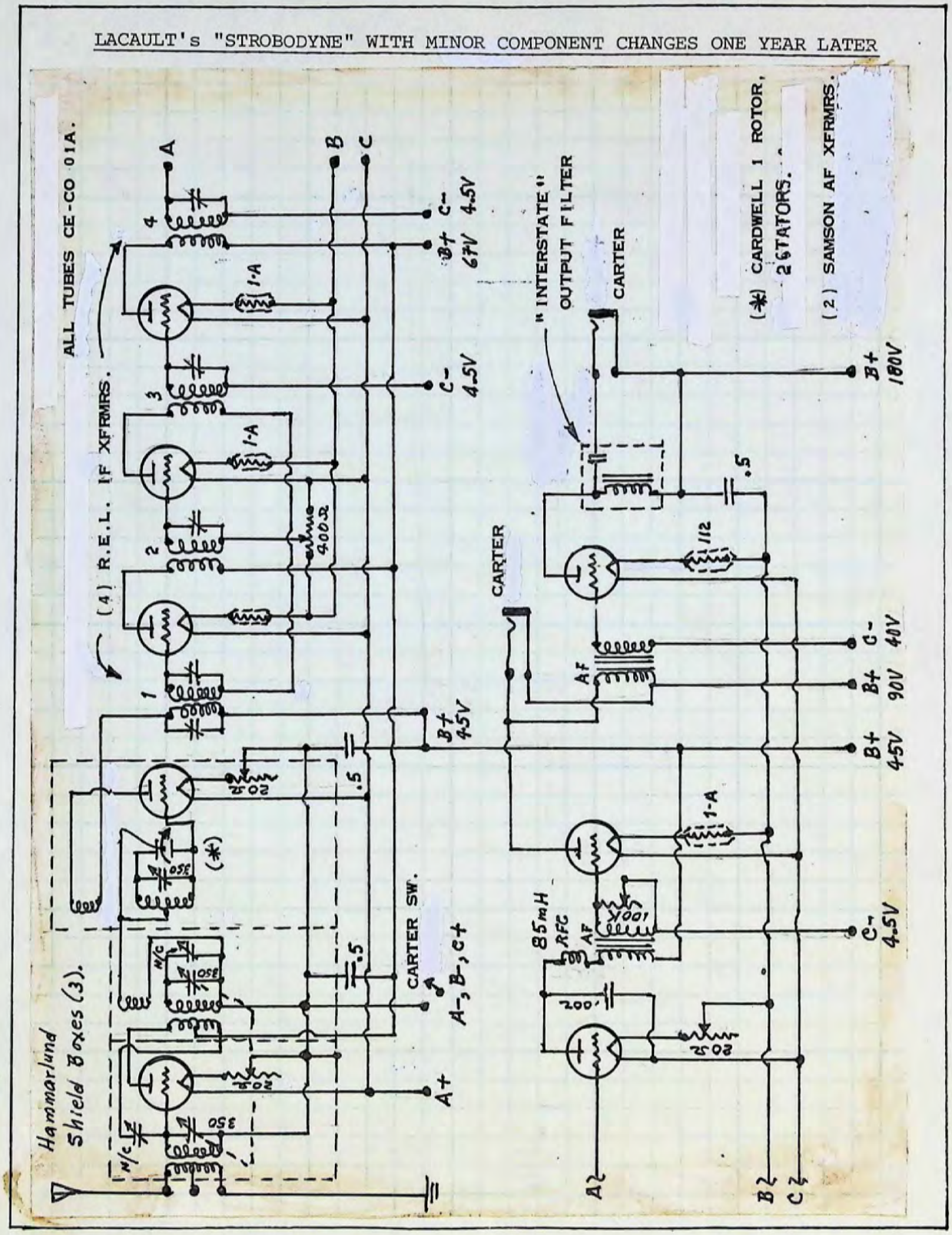


(*) - USED WITH 3-POINT LOOP CENTRE TAP.

ORIGINALLY USED FOR 3-POINT LOOP

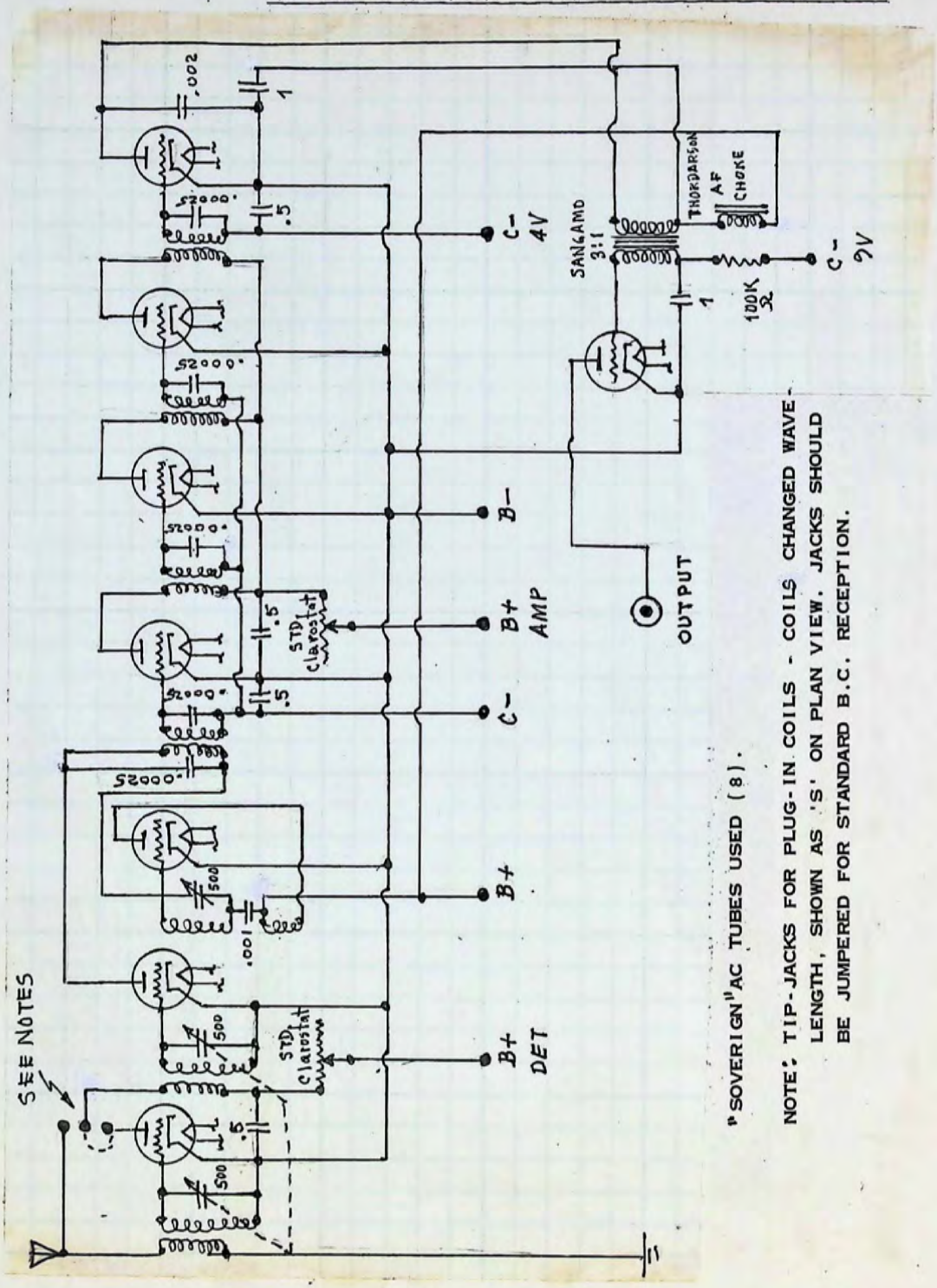
PLAN VIEW BINDING POSTS

LACAULT's "STROBODYNE" WITH MINOR COMPONENT CHANGES ONE YEAR LATER



At this late date it is difficult to say definitely whether the R.E.L.-9 preceded the AC Commander, or the other way round. The circuitry of both is remarkably similar, but the differences are too minute to claim that they reflect two distinct circuits. I am inclined to believe the ac Commander, came first.

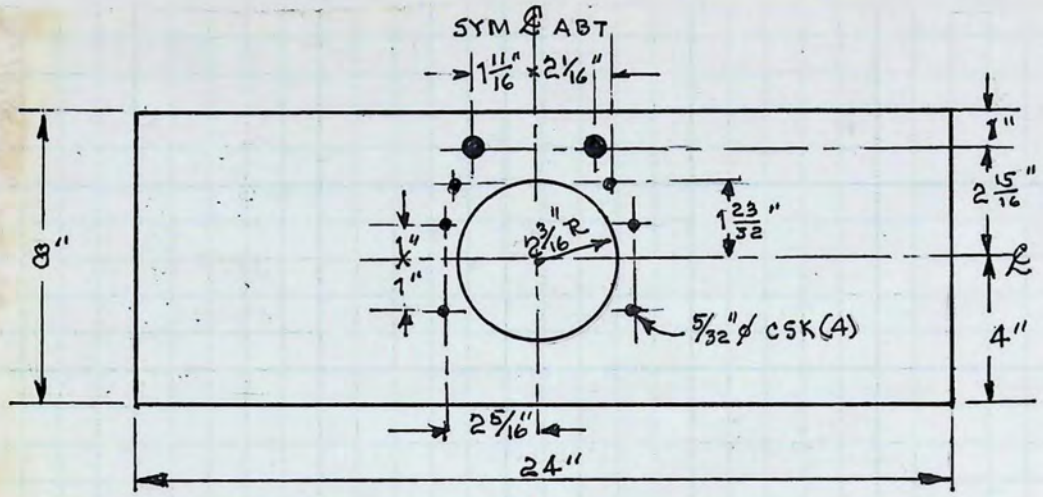
LACAULT's R.E.L. - 9 ALL-WAVE ELECTRIC; Sht. 2



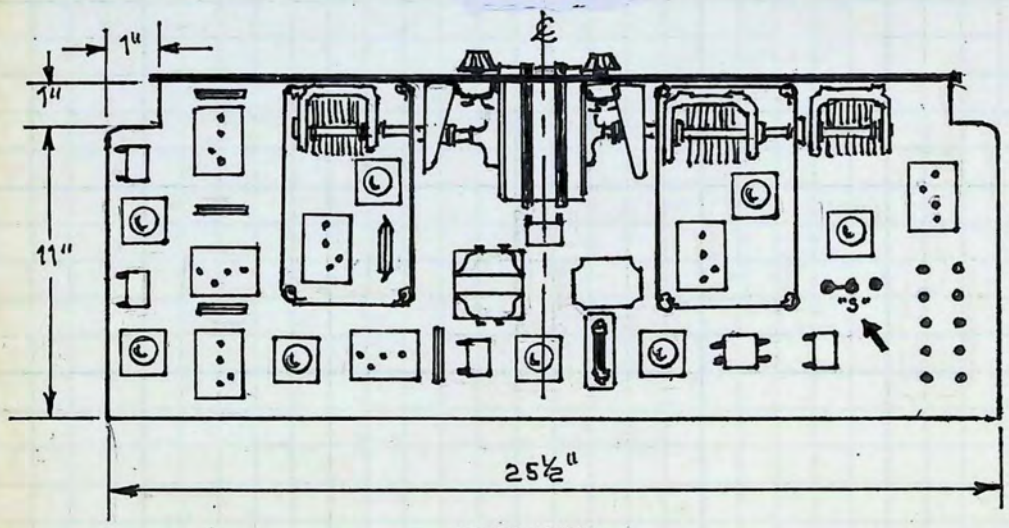
"SOVERIGN" AC TUBES USED (8).

NOTE: TIP-JACKS FOR PLUG-IN COILS - COILS CHANGED WAVE-LENGTH, SHOWN AS 'S' ON PLAN VIEW. JACKS SHOULD BE JUMPERED FOR STANDARD B.C. RECEPTION.

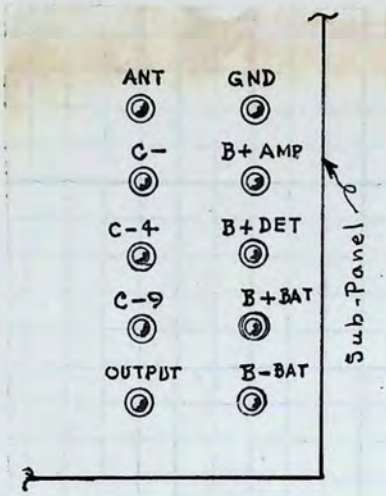
LACAULT's R.E.L.-9 ALL-WAVE ELECTRIC; Sht. 3



PANEL



PLAN VIEW



BINDING POSTS
(Plan View)

ADJUSTING THE R.E.L.-9

1. Adjust all resistors so that the arms are more or less centered.
2. Set the rheostat on the Power Amplifier at its center.
3. Turn set ON and allow tubes to warm-up.
4. Adjust upper left knob on panel after a station has been tuned in. This knob also controls the sensitivity of the RF tube in the input circuit.
5. Adjust the right-hand knob for volume and desired clarity. This knob controls the three amplifying tubes.
6. It is as simple as that.

* * *

ELECTRAD 'TRUVOLT' VARIABLE RESISTOR 25 WATTS.

STANDARD CLAROSTAT 20 WATTS

LACAULT'S R.E.L.-9 DID NOT SUCCEED AS IT SHOULD HAVE, DUE IN PART TO HIS CHOICE OF SOVEREIGN AC TUBES, WHICH WERE AWKWARD TO WORK WITH, AS WELL AS BEING UGLY.

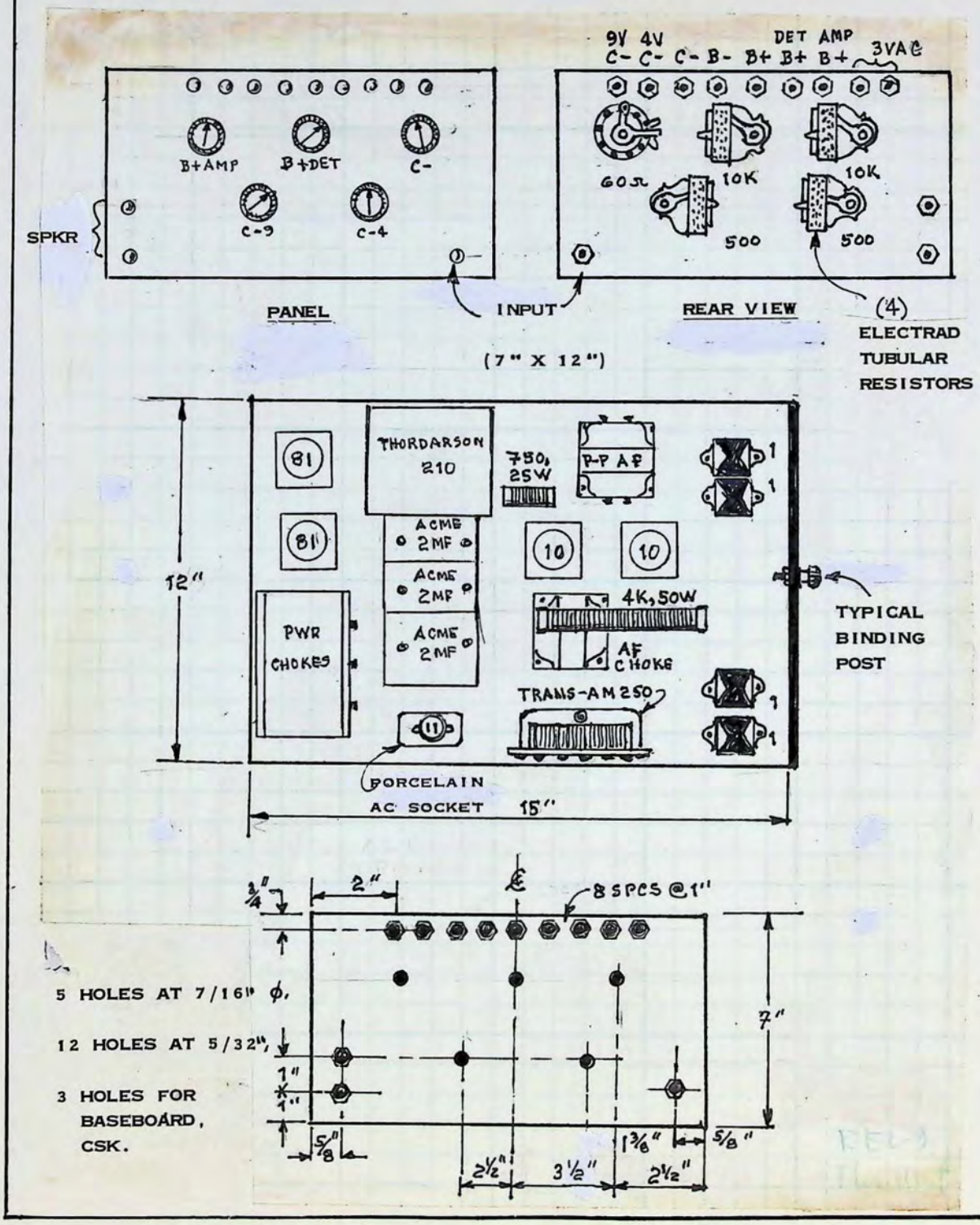
HOWEVER, THE CIRCUIT WAS WELL-THOUGHT OUT, AND YOU MIGHT WANT TO COMPARE IT WITH LACAULT'S AC COMMANDER AND HIS LR-4.

IF YOU HAVE THE R.E.L.-9 OR WISH TO CONSTRUCT ONE FROM SCRATCH, I WOULD RECOMMEND SERIOUS CONSIDERATION, AS THE TONAL QUALITY AND EXTREME SENSITIVITY WILL IMPRESS YOU, I FEEL.

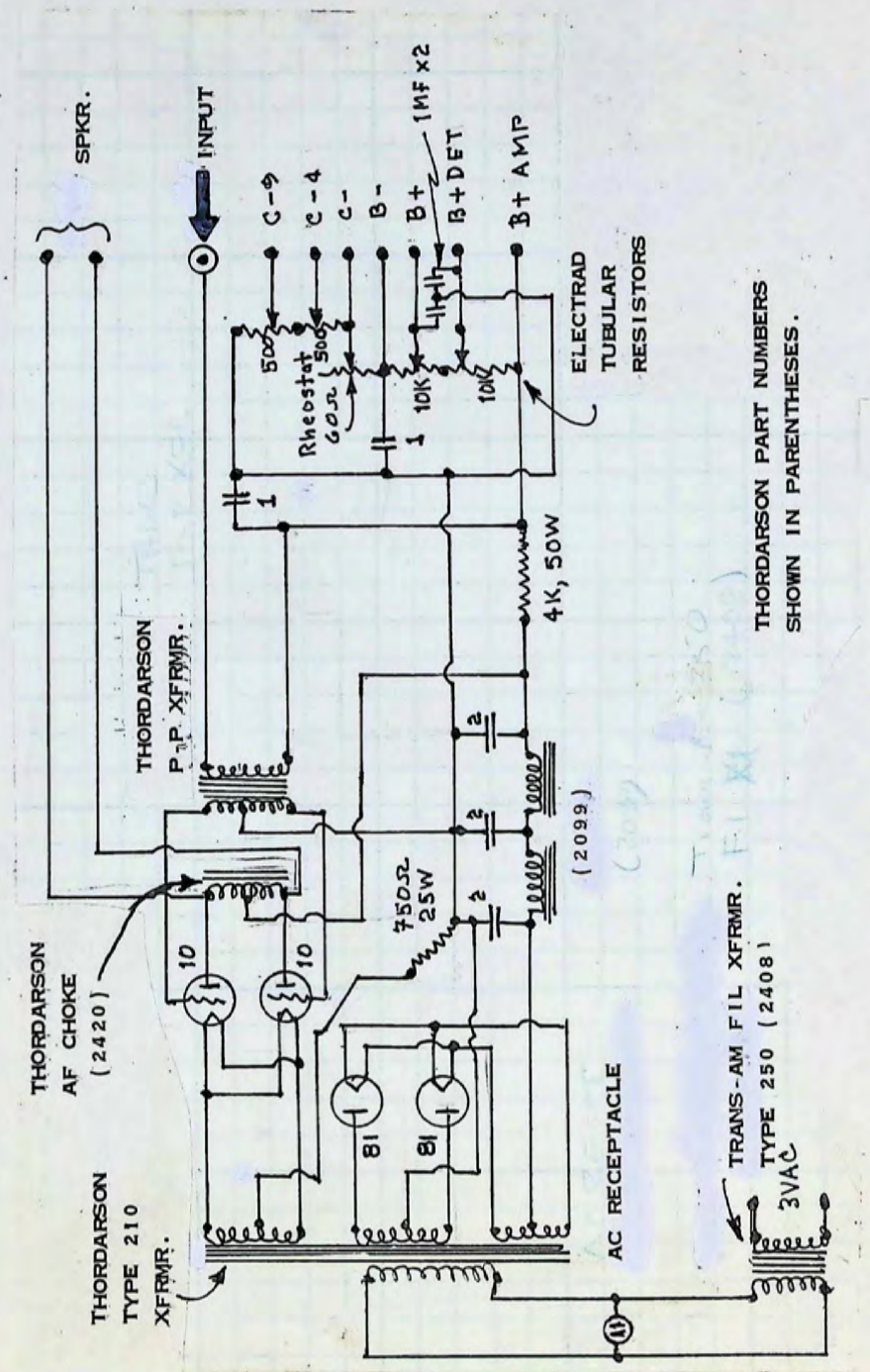
I WOULD SUGGEST, HOWEVER, THAT YOU REPLACE THE ORIGINAL SOVEREIGN TUBES WITH LATER SCREEN-GRID TYPES TAKING 2.5VAC ON THE HEATERS, OR MAKE THE VERY MINOR MODIFICATIONS NECESSARY FOR OTHER AC TUBES.

* * *

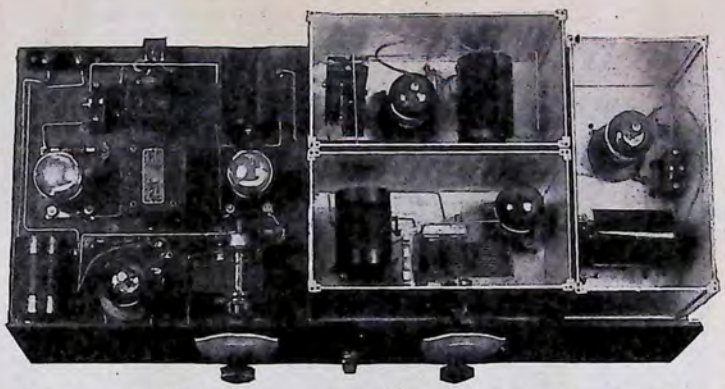
R.E.L.-9 POWER AMPLIFIER; Sht.5



R.E.L.-9 POWER AMPLIFIER; Sht. 6



Build the Greatest Circuit—RE 29!



The neat and efficient arrangement of parts in R. E. Lacault's RE29.

Lacault's Last and Best Receiver!

FOR sheer sensitivity the screen-grid receiver, the RE29, surpassed any circuit he ever tried, R. E. Lacault said, just before his death. So that this extreme sensitivity could be utilized properly, Mr. Lacault spent many trying months until he developed the circuit to a remarkably high point of selectivity, with utter stability. That done, he knew he had a wonderful receiver, one that his large following, eagerly awaiting a screen grid adaptation of his original modulation system, would build with delight and operate with ecstacy! The RE29, successor to a long line of successful Lacault receiver designs, is here. His last circuit, his best circuit, may now be duplicated by constructors!

THE receiver consists of six tubes (including first audio) in the table chassis and two tubes (a push-pull output) in the B supply and power amplifier. Hence the receiver proper uses eight tubes. Two 281 tubes are used as rectifiers. So well are each independent stage and the group of stages designed that abnormally high amplification prevails. Distant stations "roll in" easily, with volume to spare. The master designer of DX circuits took good care of that!

Build this receiver and the Push-Pull Power Amplifier B supply from the official blueprints.

Send for your free copy of the Builders' Information Sheet today!

BLUEPRINTS!

BUILD the RE29 and the Push-Pull Power Amplifier B Supply from the official blueprints! The price of the blueprint for the 6-tube receiver RE29 (including first audio) is $1.50.

The price of the Push-Pull Power Amplifier B Supply blueprint is $1.00.

All orders filled promptly.

Get your FREE copy of the Builders' Information Sheet TODAY!

All Parts in Stock for Receiver and Amplifier.

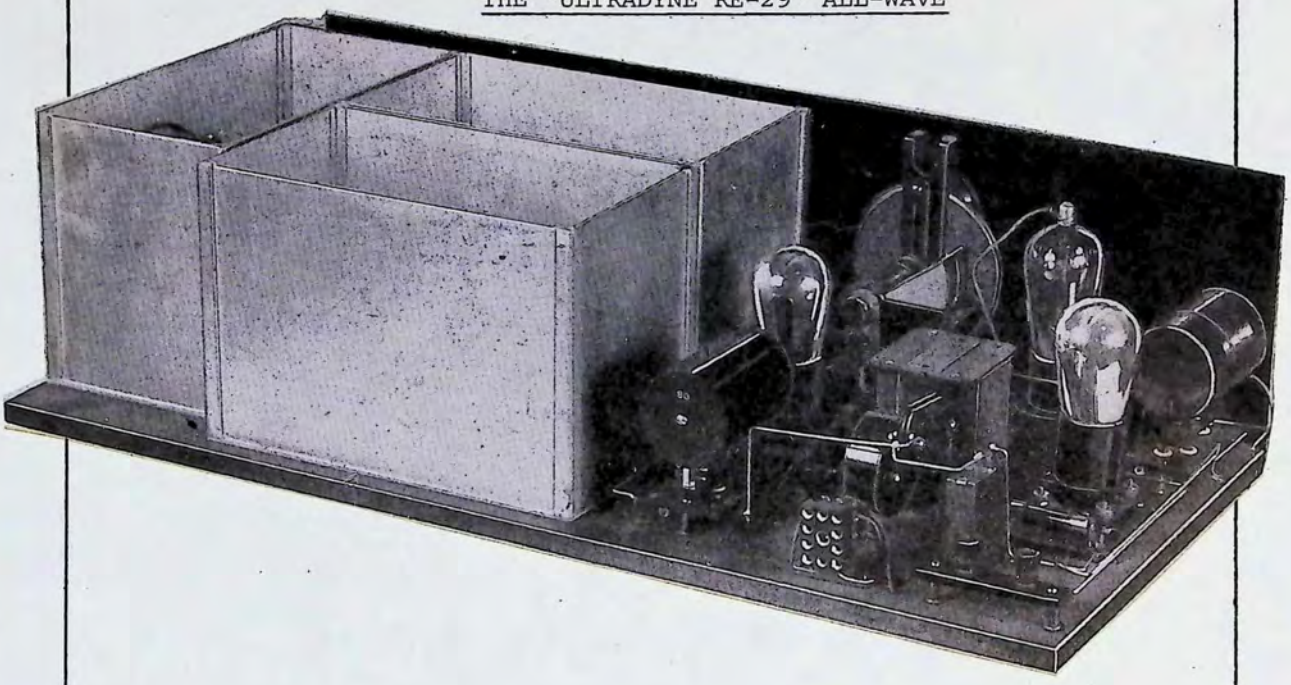
Estate of R. E. Lacault (Alice Lacault, Adm'trix)
1931 B'way, N. Y. City (65th Street).

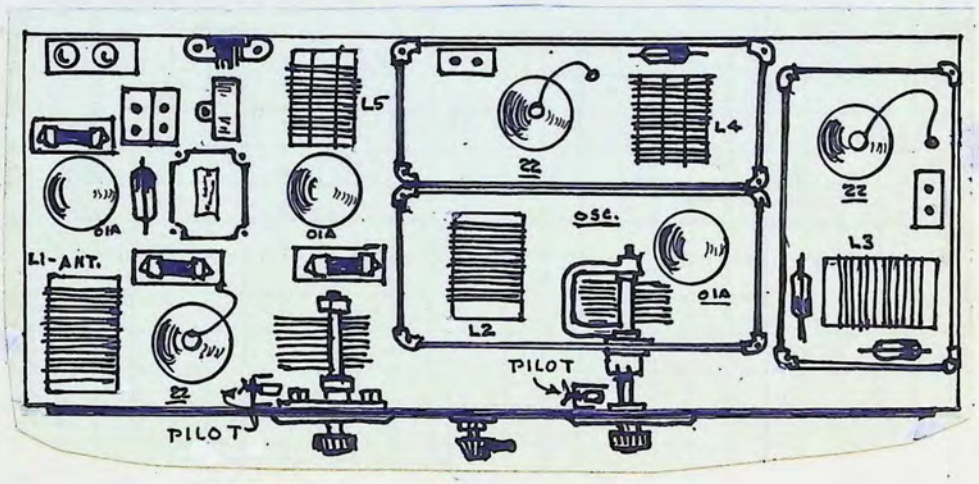
☐ Enclosed please find $1.50 for which please send at once blueprint of the 6-tube RE29 Receiver.
☐ Enclosed please find $1 additional for blueprint of the Push-Pull Power Amplifier B Supply.
☐ 50c for construction article.
☐ Please send FREE copy of the Builders' Information Sheet on the complete RE29.

Name .....
Address .....
City .....State.....rw

LACAULT's LAST DESIGN

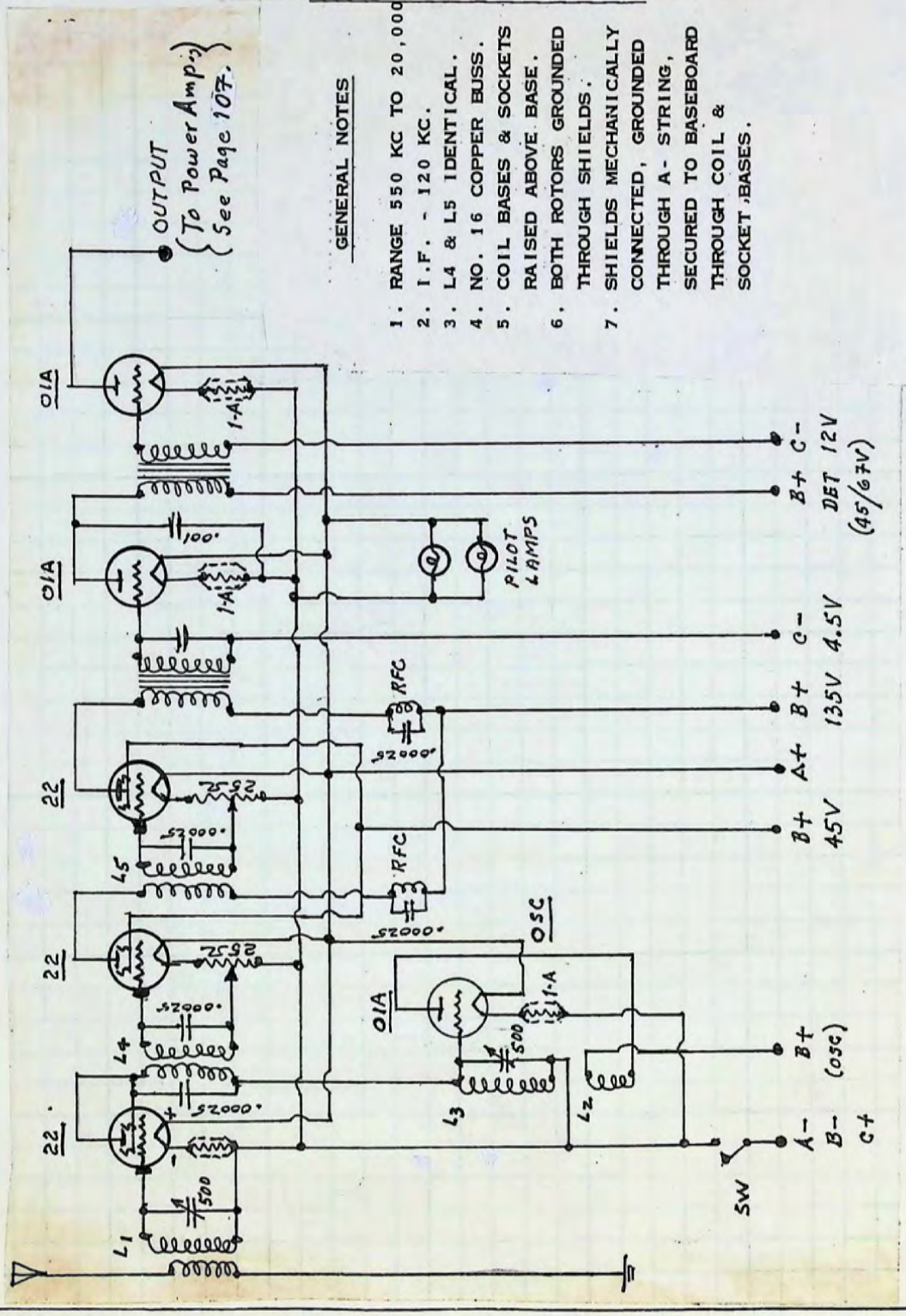
THE "ULTRADYNE RE-29" ALL-WAVE





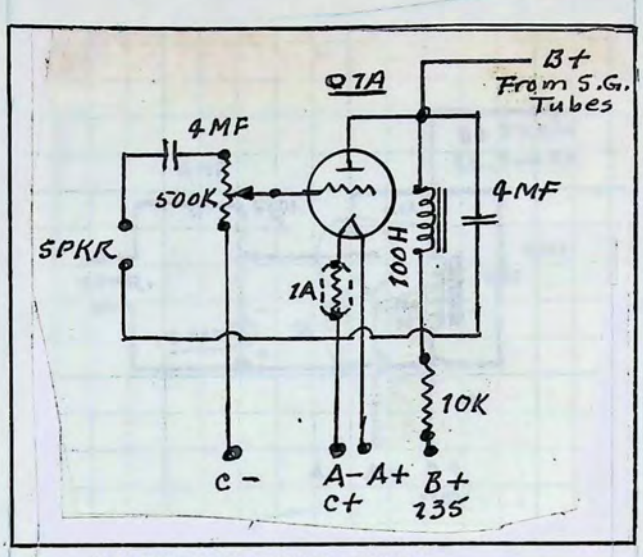
(Sht. 2)

LACAULT's ULTRADYNE RL-29



(Sht. 3)

LACAULT's "ULTRADYNE RE-29"



AVC TO HAVE BEEN ADDED

(From Lacault's Notebooks.)

GENERAL DATA

Panel = 7" x 24" x .189".
Baseboard = 12¼" x 25½" x .75".

Fritts Cabinet #5524 specified by Lacault.

Lacault B1, ANT Coupler w/ base.
Lacault B2, OSC Coupler w/ base.
Lacault F2 IF Transformer w/ Base(2).
Lacault CL, RF Transformers (2)

Hammarlund 500 mmf Variables (2).

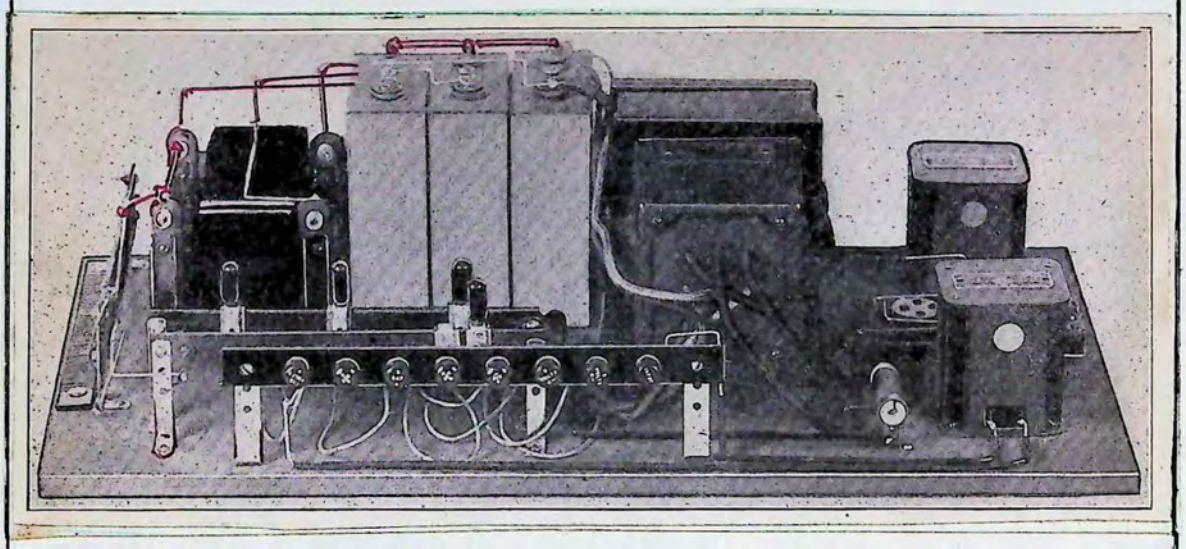
Sangamo 3:1 AF Transformers (2).

Jones 10-point Multi-Plug.
2.5V Pilot Lamps (2).
Amperites (3) 1A; (1) 622.
Yaxley Filament Switch.
25-ohm Resistors, tapt at 15-ohms (2).

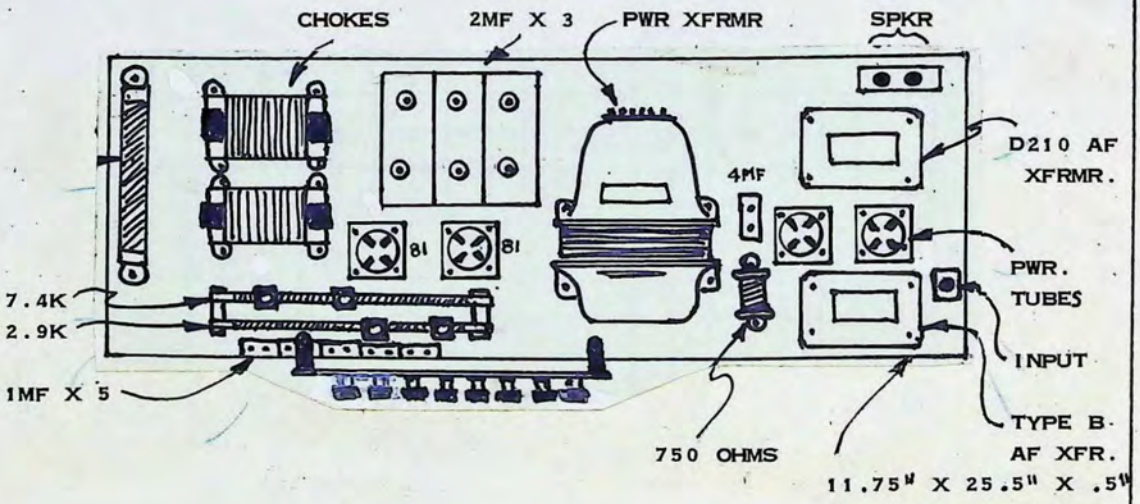
Fixed Condensers-(2) .5 mf; (6) .00025 mf; .001 mf.

(Sht. 3)

LACAULT's "ULTRADYNE RE-29" POWER SUPPLY



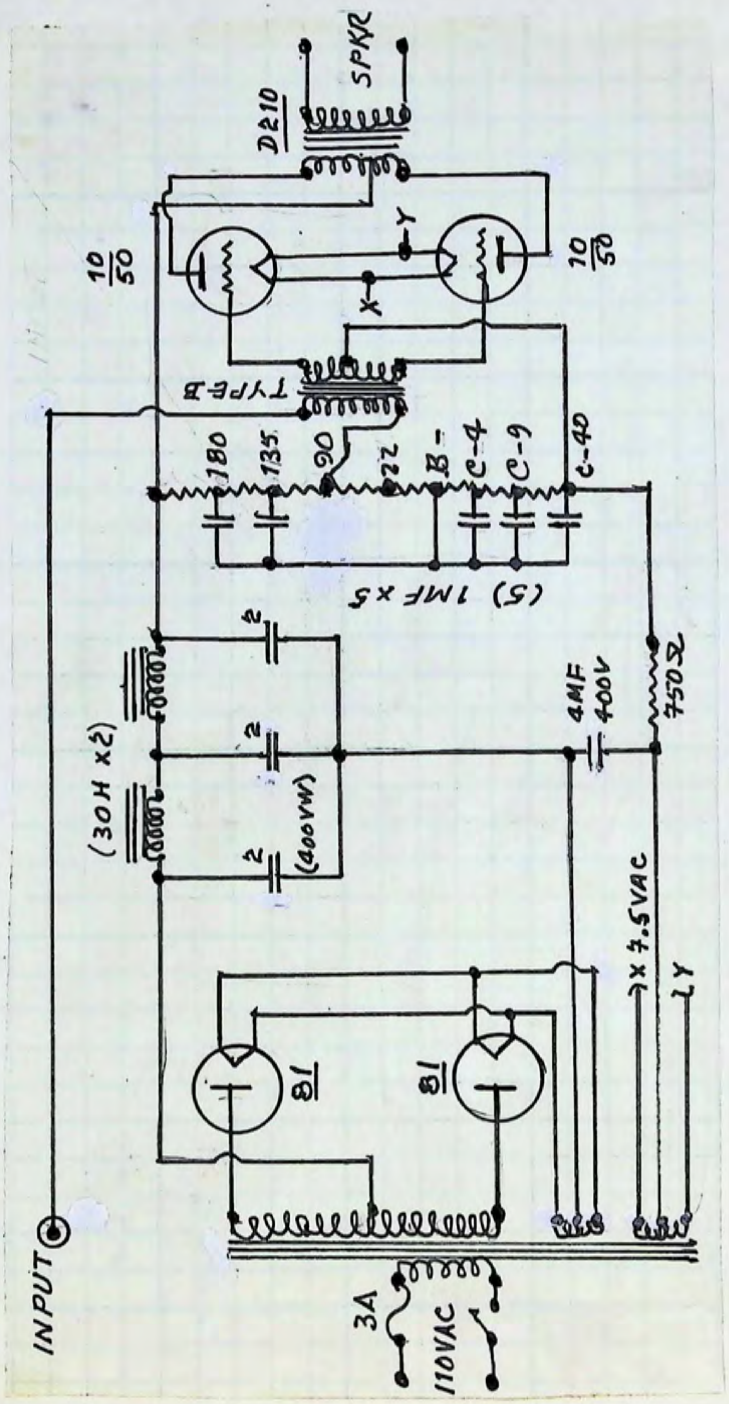
FRONT VIEW



PLAN VIEW

(Sht. 4)

LACAULT's "ULTRADYNE RE-29" POWER SUPPLY



GENERAL NOTES

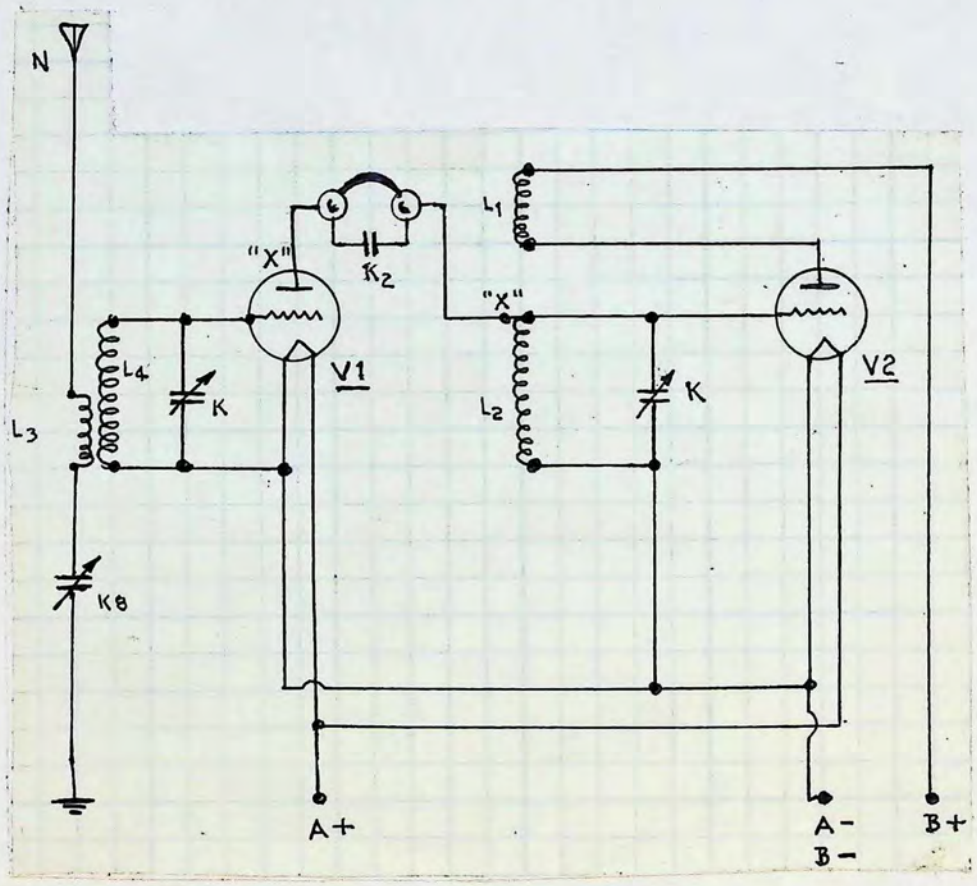
1. GEN-RAD VOLTAGE DIVIDER W/ SLIDING TAPS - 7.4K & 2.9K (2 RESISTORS IN SERIES).
2. SANGAMO TYPE B AF XFRMR. & TYPE D210 OUTPUT XFRMR.
3. TYPE PF250 POWER XFRMR.
4. TYPE 854 FILTER CHOKES.
5. ALL CAPACITORS 400 VOLTS WORKING.

LACAULT's PATENT #1,740,946

The date of issuance of Lacault's last patent was Christmas Eve, 1929 - nine months after his death. The patent was passed onto RCA by Mesne Assignments, patent attorneys, who apparently were handling Lacault's estate through Alice Lacault.

The sketch below represents the extent of information readily available, without wading through the 60-year-old files of the U.S.Patent Office. The letter designations appear on the original patent drawings; values unknown. The patent claim read in part:

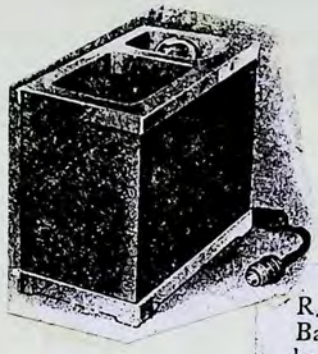
"The important feature resides in the employment of the internal resistance or impedance of a vacuum tube as a variable resistance in the circuit; and making use of the Plate-Filament resistance in the reception of signals."



ROBERT E. LACAULT, for several years Managing Editor of RADIO NEWS, has completed all of his radio activity. Mr. Lacault, who was recognized as one of the leaders of radio in this country and who, during the war, did a great deal of development work under the personal direction of General Ferrie of the French Army, was responsible for a number of very valuable contributions to the radio art. The Ultradyne Receiver was one of his outstanding achievements, and will be remembered by many of our readers.

Mr. Lacault, who passed away on March 12, 1929, is survived by his widow, Mrs. Alice M. Lacault, who contemplates continuing the radio business started by Mr. Lacault upon his resignation from the staff of RADIO NEWS.

We know that we are expressing the feelings of a great many of our readers in extending to Mrs. Lacault our heartfelt sympathy.



A New Development Insures Remarkable Radio Reception

R. E. Lacault, our chief engineer, has had a real-honest-to-goodness "B" Battery Eliminator developed to meet his own exacting requirements and he has authorized us to guarantee this Eliminator without any reservations.

Here is a "B" Battery Eliminator—a real Eliminator—Endorsed by one of the foremost Radio Engineers of United States and France. And, it is sold on a money-back guarantee basis.

It will deliver ample "B" Battery current supply to operate any radio set from one to ten tubes; and is particularly efficient when applied to neutrodynes, 8 and 10 tube super-heterodynes and Ultradynes L-1, L-2 and L-3.

It puts new pep in your set!

No Hum		No Battery Replacements
No Acid	No Leaky Cells	No Fuss
No Recharging	No Spoiled Rugs	No Bother

Remember your first cost is the only cost and your "B" Battery troubles are banished forever. Nothing to wear out. The unit is compact and of rigid construction. Just plug into your electric light socket and you have top-notch "B" Power at your service. The current consumption is negligible; but the receptive qualities of your receiver will be improved to a marked degree.

The only Eliminator with a variable control on Radio Frequency

One Variable Control for detection from 0 to 65 volts.

One Variable Control for R. F. Tubes from 40 to 120 volts.

One Power Control for Audio Tubes from 90 to 180 volts.

Don't just take Mr. Lacault's word for this—as this Eliminator is sold on a money back basis—Simply send us your order and we will forward the Eliminator by express C. O. D. Test it for five days and if it does not do all we claim—return it to us and your money will be cheerfully refunded, without question.

This new "B" Eliminator will save you money—save your temper—and will give you much pleasure in the efficient way it operates.
Clip the coupon—Don't delay.

5 DAYS FREE TRIAL

PHENIX RADIO CORPORATION
114 East 25th St., New York, N. Y.

Gentlemen:—Please send me C. O. D. plus shipping charges, one "B" Battery Eliminator, approved by Mr. R. E. Lacault.

☐ **110 Volts, alternating current, 60 cycles, complete.....$55.00**

It is agreed and understood that if the eliminator after it is received by me, is not satisfactory, I will return it within five (5) days, and my money will be refunded without question.
(Or) I enclose full remittance herewith and you are to prepay express charges.

SIGNED: .....

STREET: .....

CITY: ..... STATE:.....

☐ **"B" Eliminator for D.C. Current is.....$25.00**

Check Eliminator Desired

(Sht. 1) NAKKEN's "ULTRA-5", 1927

Theodore H. Nakken, a radio engineer of repute in middle Twenties, was sufficiently impressed by the modulation concept of Lacault that he set about to design his own more modest version. A single article, by Nakken, appeared in the 1927 edition, *Amateurs' Handibook*, but was never referenced again. Nakken wrote in part:

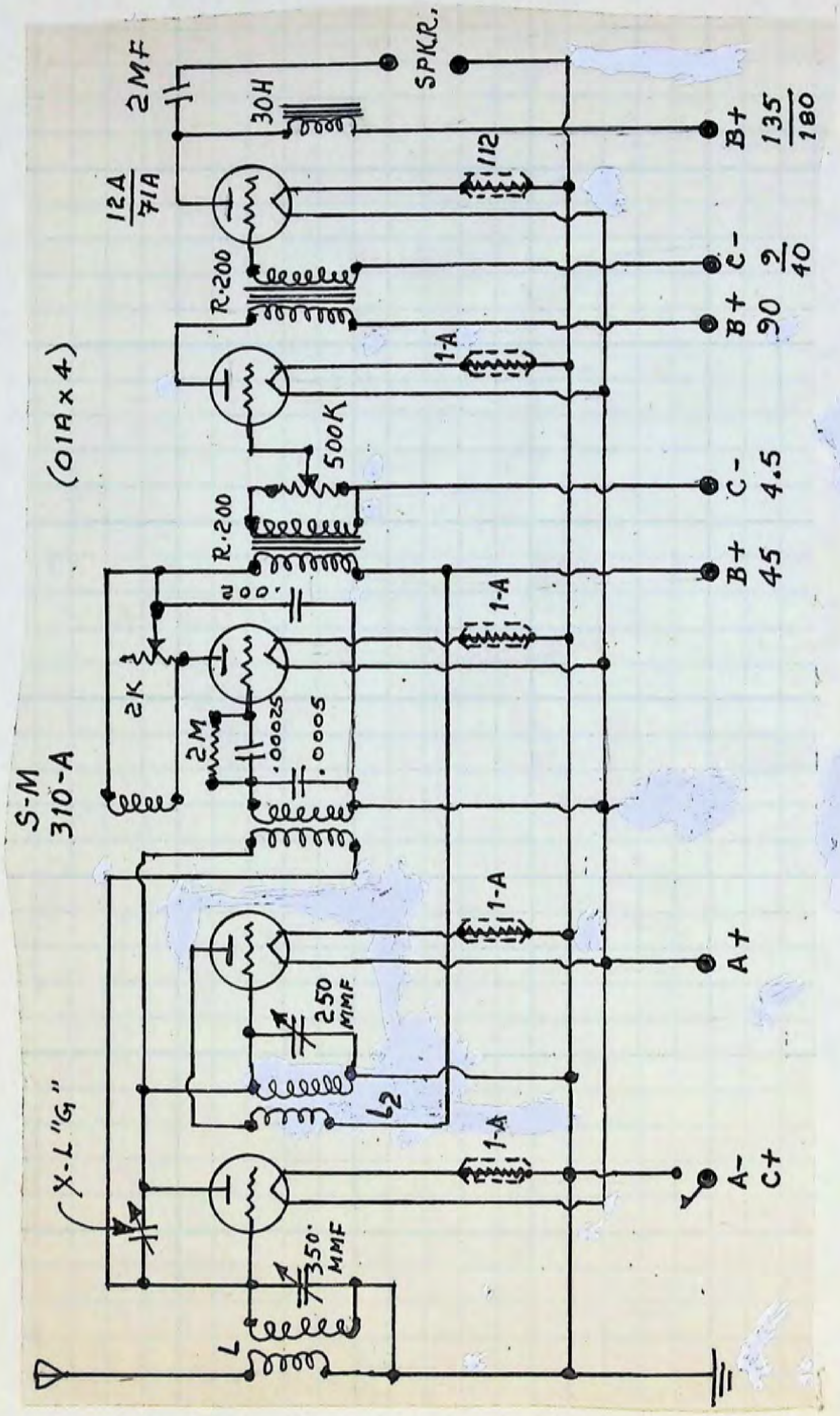
"The tendency of the first detector to oscillate has always been objectionable. This objection to the super-heterodyne is done away with in the creation of the 'Ultradyne' circuit by Mr.R. E.Lacault, whose modification of the first detector circuit did away with the troubles due to the use of a first detector."

Nakken's "Ultra-5" used standard parts of the period except for the coils, data of which is given over-leaf. The set is a very easy construction project, and works quite well. In San Francisco it has pulled in signals from Casper, Wyoming, Denver, Salt Lake City, Las Vegas, Dallas, although it must be admitted that the best reception occurs around three in the morning.

By changing the Amperites listed, any UX-type tube could be employed. While there is nothing radical about this set, spacing between the shafts of the variables was critical. You will note the odd tie-in of B+ at the second AF transformer and B- terminal cable jack. It works.

The name "Ultra-5" has always been a bit confusing, considering that the Mid-West company also offered a factory set bearing the same name in the late Twenties. However, there is no similarity of circuitry, the Nakken circuit being the better one. While it was, and remains, the fashion to attach fancy names to circuits, a name cannot be copyrighted, although it can be registered. If you go through available references of early manufacturers, you'll find several companies employing the same trade-name or label.

NAKKEN's "ULTRA-5", 1927: Sht. 2



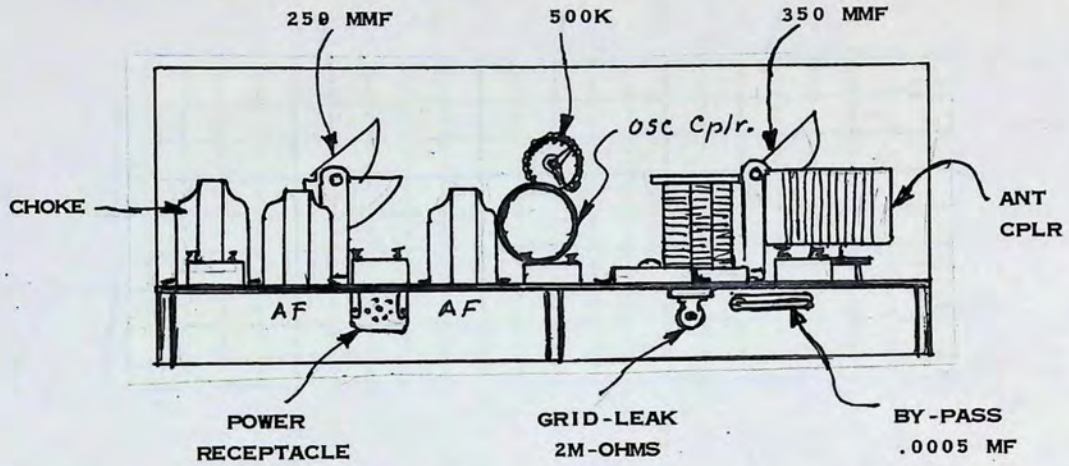
LIGNOLE PANEL - 7" X 21"

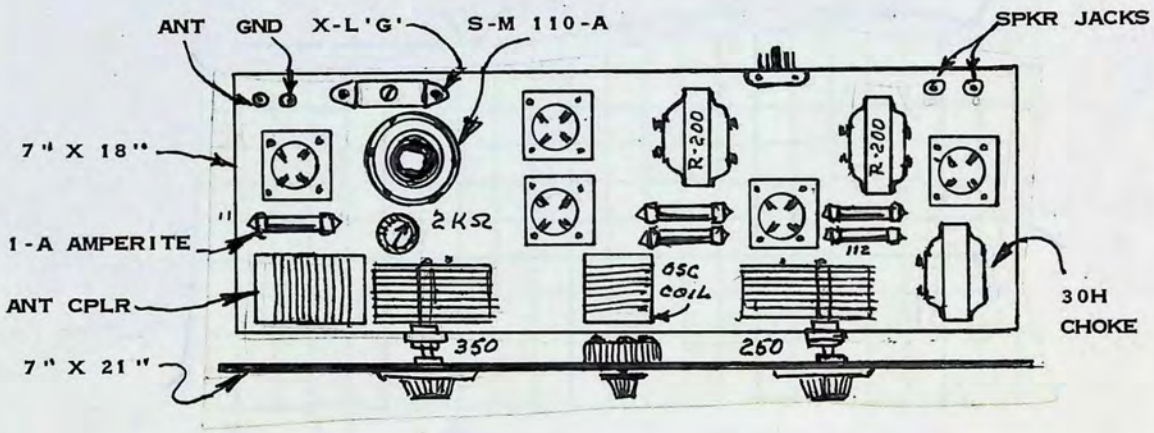
YAXLEY OR JONES MULTI-PLUG.
HAMMARLUND VARIABLES 250 & 350 MMF.
30 H AF CHOKE.

LIGNOLE SUB-PANEL - 7" X 18"

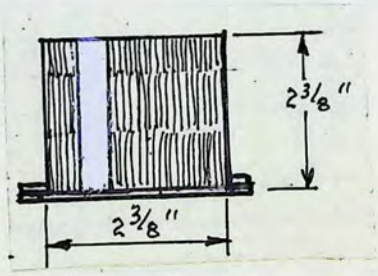
EBY VERNIER DIALS.
THORDARSON R-200 AF XFRMR.
TIP-JACKS FOR ANT, GND, SPKR.

NAKKEN's "ULTRA-5", 1927: Sht. 3



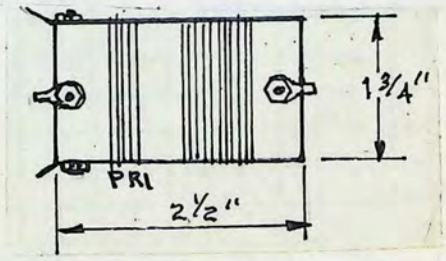


PLAN VIEW



ANT CPLR. (L)

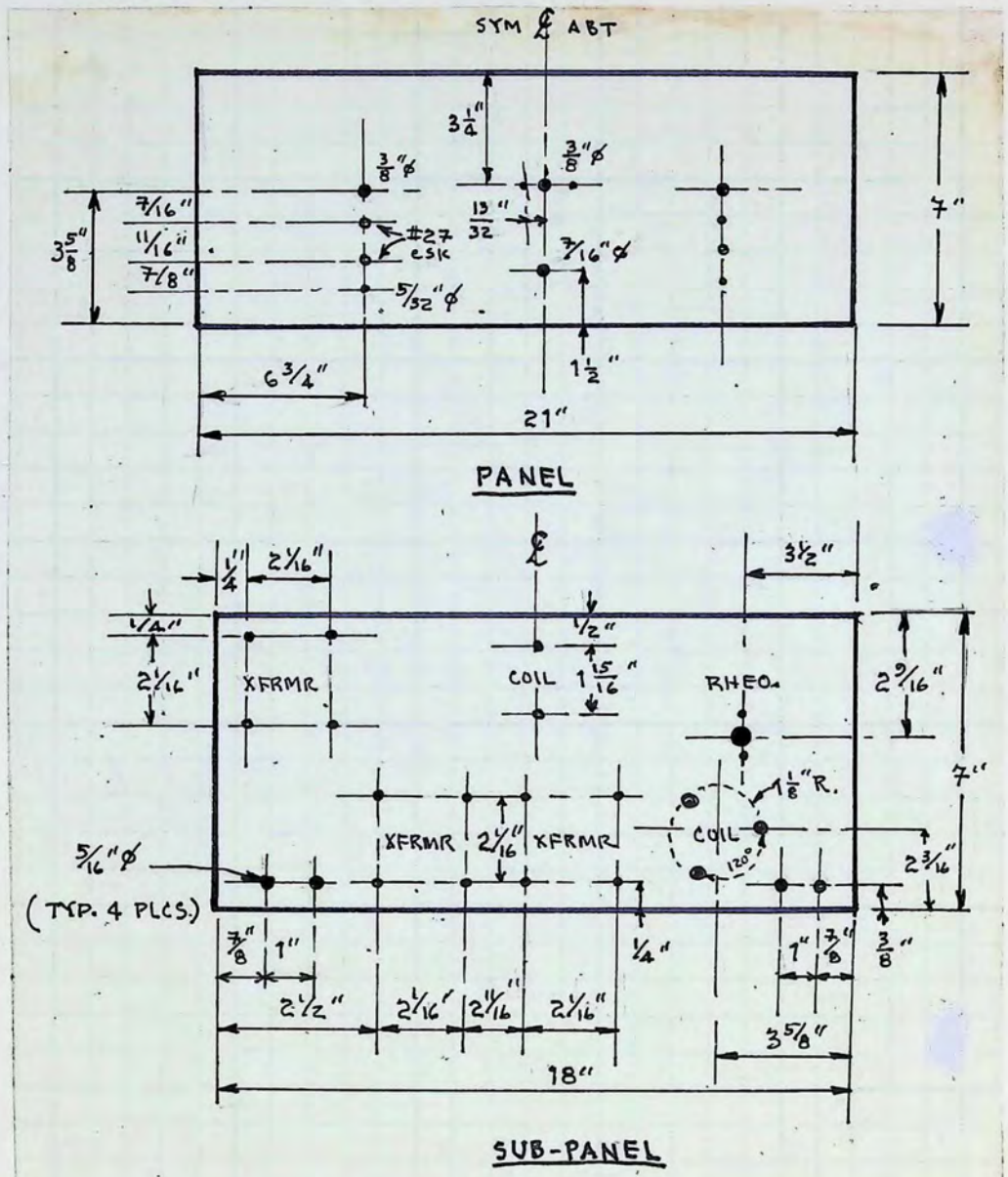
PRI - 16 T NO. 24 DSC
SEC - 80 T NO. 24 DCS



OSC CPLR. (L2)

PRI - 15 T NO. 26 DSC
SEC - 42 T NO. 26 DSC

(Sht. 4) NAKKEN's "ULTRA-5", 1927



Holes for sockets & Amperites not shown, for clarity.
Connecting wires pass through sub-panel.
All holes drilled with a No. 42 drill ~ except as shown.

(Sht. 5) NAKKEN's "ULTRA-5", 1927

NAKKEN's THEORY OF OPERATION:

A plate current can flow only when the plate is made positive, if we apply an alternating potential to the plate of the first DET, the tube will function only at the moment when its plate is positive, and not at all when its plate is negative, or zero.

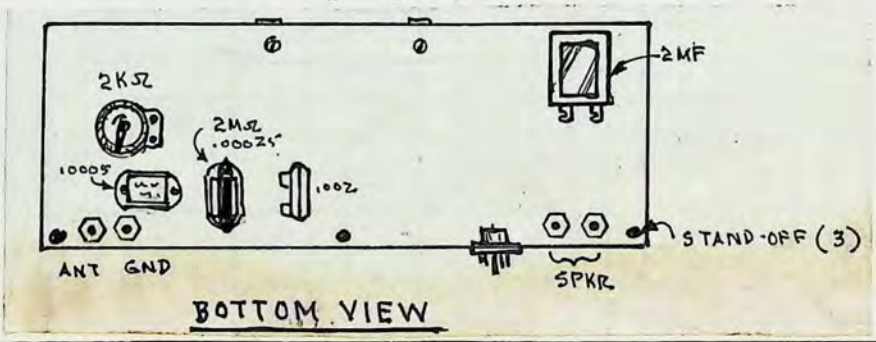
Following Lacault's concept, the plate of the first DET's connected, through its IF PRI, to the grid of the OSC tube. This grid varies in potential from a maximum negative to a maximum positive. The varying potential is applied to the plate of the first DET, so that it functions more or less intermittenly.

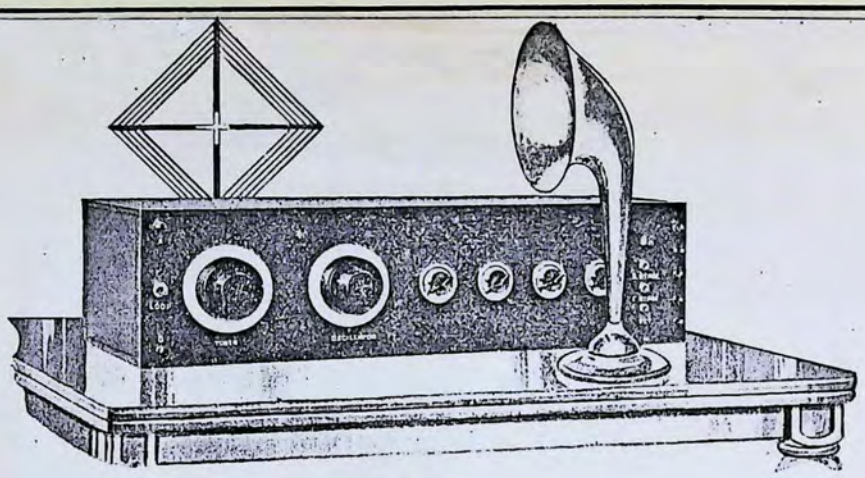
Through this peculiar action, the DET works as a mixer. A signal is detected by it, and reduced to a frequency which is exactly equal to the difference in the two frequencies of the incoming signal, and the OSC. It is this frequency signal which, in Nakken's "Ultra-5", is fed directly to the regenerative second DET.

Neither grid-leak nor grid condenser is attached to the first or mixing tube, but the ANT is coupled directly to the grid. Not necessary, is the way Nakken dismissed them, because the plate of the mixing tube is not connected to any positive (+) point of the general "B" supply, but is connected through the PRI of the IF cplng. coil to the grid of the OSC tube. In this way the incoming signal is caused to beat with the IF surges of current through the mixing tube, resulting in the plate current flowing through this tube & modulated by the incoming signal, at any beat frequency desired.

Nakken deviated from Lacault's "ULTRADYNE" concept in replacing the IF transformers by a coil unit, consisting of a more conventional PRI, SEC, and TICKLER, having six terminals. Regeneration is controlled by the non-inductive variable resistance mounted on a baseboard, as shown, shunted across the Tickler, which is placed close to the plug-in coil. In all, this is a very neat set, and works well.

* * *





The famous Ultradyne engineers recommend

ACCURATUNE

MICROMETER CONTROLS

On Ultradyne and Super-Heterodyne receivers, in which close tuning apparatus is employed, engineers recommend micrometer controls in preference to ordinary dials. R. E. Lacault, A. M. I. R. E., designer of the famous Ultradyne, recommends only the Accuratune Micrometer Tuning Control for use with this set.

The Accuratune is not a mere dial, but an actual micrometer tuning control, very responsive to the slightest touch of the micrometer knob, and ten times more efficient than any other tuning device. Stations that have never been heard before, are brought in clearly when tuned with the Accuratune.

Designed for either coarse or precise tuning and to fit all standard condenser shafts. Guaranteed. Price $3.50. At your dealers, otherwise send purchase price and you will be supplied postpaid.

THE MYDAR RADIO COMPANY

9-A Campbell Street, Newark, N. J.

Radio, Ltd., Montreal, Canada

Canadian Representatives

in 1925

the Ultradyne L-2 was the first receiver to listen in on London in the International broadcast tests. Thousands of experimenters built this set because of its marvelous results recorded in the radio press.

in 1926

again—Dr. J. D. Hullinger of Clinton, Ia., won first prize in the Radio Digest contest for best verified foreign reception during International Broadcast Week. He employed the Ultradyne L-2 of course.

A Home Built Ultradyne

THE Ultradyne L-2 is a consistent distance getter. From 7.30 P.M. Friday, February 26 to 5.10 A.M. Saturday, February 27th, Aaron Whitener of La Grange, Texas, logged 72 stations, totaling 69,000 miles of reception. The most distant station was Sydney, Australia, 9600 miles away.

Like Mr. Whitener, thousands have successfully built the Model L-2 Ultradyne, and claim it the most wonderful receiver they have known for great distance on the loud speaker.

In no other receiver is found the "Modulation System" of radio reception—the most sensitive form of detection.

With the application of regeneration to the "Modulation System" the Ultradyne is capable of detecting the faintest broadcast signal, regenerating and making it audible on the loud speaker.

In addition, the Ultradyne is the most selective receiver known. Regardless of close similarity in wave length, it selects any station within range—brings in broadcasting clearly, distinctively, faithfully. We guarantee the Ultradyne L-2 will give better results than any other set operating under the same conditions.

In addition to Ultradyne Kits, we carry a stock of Kits for other standard Nationally Advertised circuits.

WRITE FOR FREE DESCRIPTIVE CIRCULAR AND CATALOG OF STANDARD PARTS AND SETS

The Ultradyne Kit

Consists of 1 Low Loss Tuning Coil, 1 Special Low Loss Coupler, 1 Type "A" Ultraformer, 3 Type "B" Ultraformers, 4 Matched Fixed Condensers.

$30.00

How to Build and Operate the Ultradyne

32 page illustrated book giving the latest authentic information on drilling, wiring, assembling and tuning the Model L-2 Ultradyne Receiver **50c**

ULTRADYNE

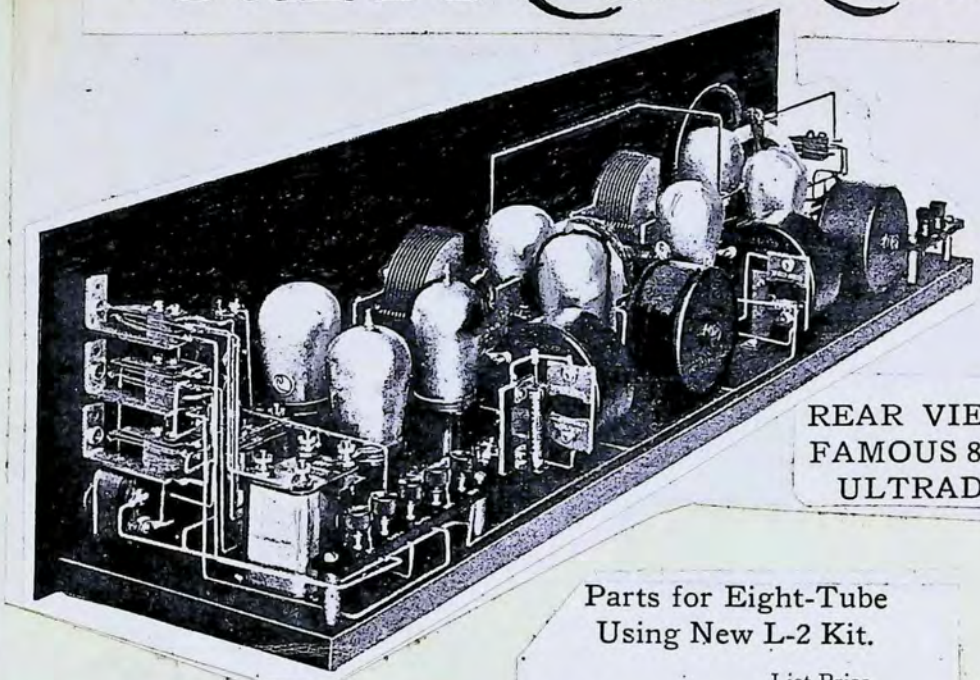
MODEL L-2

Special Repair Service Station maintained for all Ultradyne L-2 Owners.

MADISON RADIO CORPORATION

114-116 E. 28th STREET NEW YORK CITY

ULTRADYNE



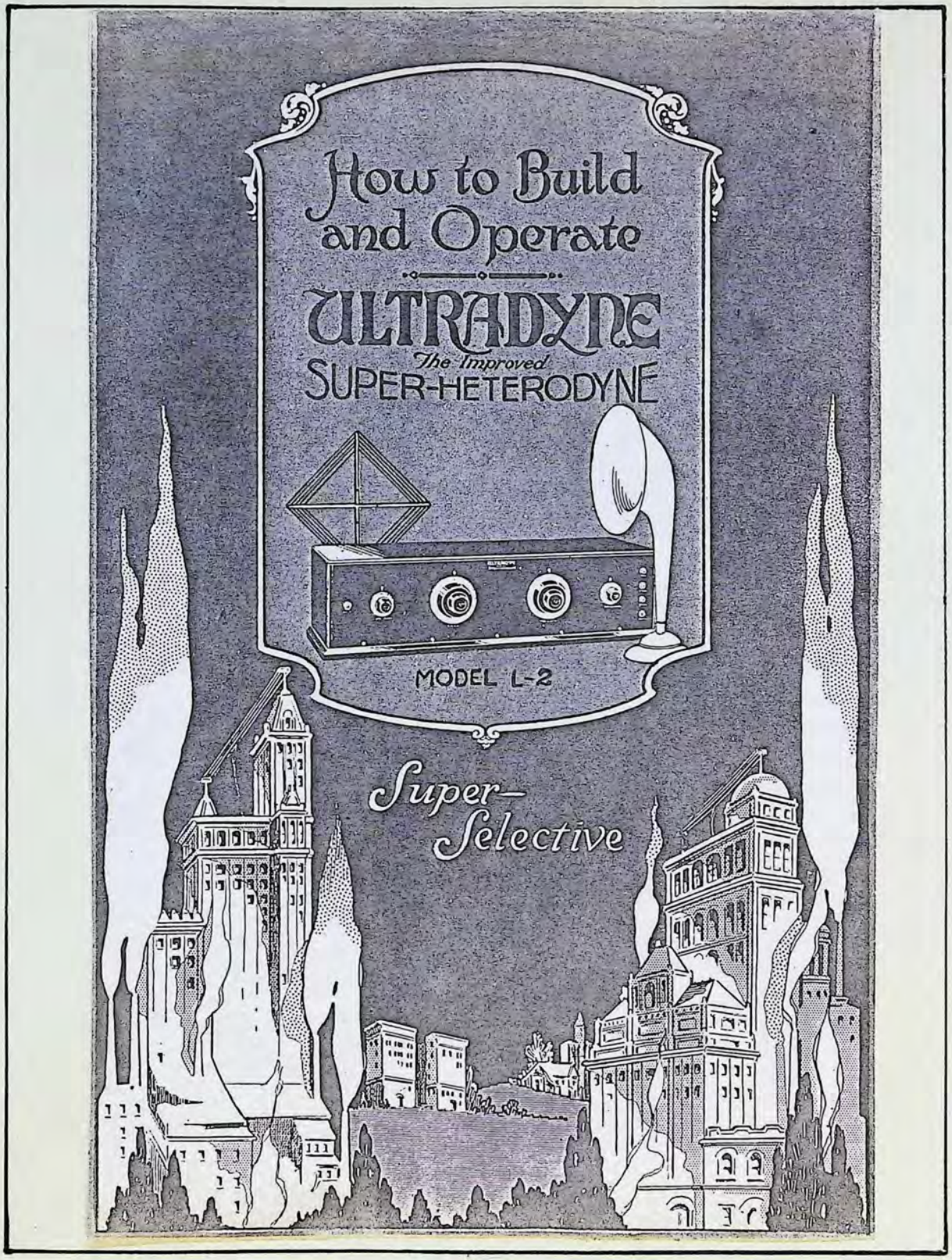
REAR VIEW OF FAMOUS 8-TUBE ULTRADYNE

Parts for Eight-Tube Using New L-2 Kit.

		List Price	
1	Black panel 7x30x3/16 drilled and engraved...		$ 7.95
2	.0005 Hammarlund Condensers, plain	$5.00	10.00
2	Ultra-Vernier Dials ...	2.50	5.00
2	Rheo Dials	.50	1.00
8	Standard Sockets	.75	6.00
1	Potentiometer 400 Ohm		2.00
8	1-A Amperites	1.10	8.80
2	Double Circuit Jacks...	.80	1.60
1	Double Circuit Filament Control Jack	.90	.90
1	Single Circuit Filament Control Jack	.85	.85
1	Walbert Lockswitch ..		.50
2	Thordarson A. F. Transformers 2-1		10.00
1	Variable Grid Leak....		.65
7	Comp. Binding Posts...		.56
1	Fixed Condenser .0005 with Grid Leak Mtg...		.45
2	Fixed Condensers .001.	.40	.80
1	Fixed Condenser .005..	.60	.60
18	Pieces Tinned Bus Bar Wire		.54
1	Ultradyne Kit		30.00
1	Ultradyne Manual		.50

Parts for Set pictured above

$88.70


How to Build
and Operate
ULTRADYNE
The Improved
SUPER-HETERODYNE
MODEL L-2
Super-
Selective

THE SINCEREST FORM OF FLATTERY?

$30.00

COMPLETE DELIVERED FREE TO YOU

MARATHON ULTRADYNE

(SUPER HETERODYNE)

The Very Newest Development in Radio at an Unheard of Low Price

Complete set as shown above, including coils and transformers ready for assembly—and with complete assembly chart, $30.00.

This is the last word in radio. Gives you extreme selectivity, absolute clarity without noise or distortion. No antenna or ground necessary.

Every set of Marathon Ultradyne parts designed and tested by N. E. Borch, internationally known radio engineer.

Send check or money order for $30.00 and we will pay all transportation charges.

Or, send no money, and we will send set—you to pay postman upon arrival.

These sets are going like hotcakes. Orders filled in rotation.

MARATHON RADIO, 579 Howard Street, San Francisco, Cal.

The above represents a bit of blatant piracy, not exactly unknown then or now in Radio. The advert appeared in 1924, practically on the heels of the first announcement of Lacault's Ultradyne. The advert was immediately challenged, and Marathon Radio was not heard of again. The name "Marathon" here, incidentally, had no relationship with the subsequent firm, same name, of tube manufacture.

SPECIFIED PARTS for the R.E.L. 9

1 Panel, drilled, 8" x 24"	Cortlandt Panel Eng. Co.
1 Binding Post Strip	Cortlandt Panel Eng. Co.
1 Strip for Pup Jack	Cortlandt Panel Eng. Co.
2 Aluminum Shields	Aluminum Co. of America
1 Double Drum Dial	Tyrman Electric Co.
3 ML-23 Condensers	Hammarlund Mfg. Co.
2 Extension Shafts	Hammarlund Mfg. Co.
8 Spring Sockets	Benjamin Elec. Mfg. Co.
1 Audio Transformer	Sangamo Electric Co.
1 .001 MF Cond	Sangamo Electric Co.
1 .002 MF Cond	Sangamo Electric Co.
1 Autoformer	Thordarson Elec. Mfg. Co.
4 Units, Type F	Radio Elec. Laboratories
2 Units, Type B1	Radio Elec. Laboratories
1 Unit, Type B2	Radio Elec. Laboratories
5 Matched Cond	Radio Elec. Laboratories
4 Parvolt Cond., 5 MF	Acme Wire Co.
2 Parvolt Cond., 1 MF	Acme Wire Co.
10 Ensign Posts	H. H. Eby Mfg. Co.
1 .1 Meg. Resistor	Arthur H. Lynch, Inc.
1 Single Mounting	Arthur H. Lynch, Inc.
2 Clarostats	American Mech. Lab.
3 Pup Jacks	Yaxley Mfg. Co.
2 Pup Plugs	Yaxley Mfg. Co.
50 ft. Colorubber Wire	Belden Mfg. Co.
12 ft. Bus Bar	Belden Mfg. Co.
1 AC Heating Transf	Transformer Corp. of A.
8 AC Tubes	Sovereign Elec. Mfg. Co.
1 Baseboard 12" x 25¼"	
1 Cabinet, 8"x24"x12"	

SPECIFIED PARTS for the POWER UNIT

1 Transformer, T 2098	Thordarson Elec. Mfg. Co.
1 Choke, T 2099	Thordarson Elec. Mfg. Co.
1 Transformer, T 2408	Thordarson Elec. Mfg. Co.
1 Choke, T 2420	Thordarson Elec. Mfg. Co.
3 Parvolt 2MF. C cond	Acme Wire Co.
4 Parvolt 1MF. A cond	Acme Wire Co.
4 Spring Sockets	Benjamin Elec. Mfg. Co.
1 Truvolt Res., C.40	Electrad, Inc.
1 Truvolt Res., B-7.5	Electrad, Inc.
2 Truvolt Res., T.100	Electrad, Inc.
2 Truvolt Res., T.5	Electrad, Inc.
1 Rheostat, 60 ohms	Yaxley Mfg. Co.
1 Panel, drilled, 7" x 12"	Cortlandt Panel Eng. Co.
12 Ensign Posts	H. H. Eby Mfg. Co.
20 ft. Bus Bar	Belden Mfg. Co.
1 Baseboard, 12" x 15"	

TWO ULTRADYNE FANS

Editor, RADIO NEWS:

I will make no claims to have the most sensitive receiver or champion DX-getter; but I am well satisfied with my Ultradyne, model L2, designed by R. E. Lacault, and first made known to me through the RADIO NEWS Superheterodyne Book. I built this the first week in July, and did not erect an aerial, as there are so many on our roof and other houses nearby that they look like barbed wire entanglements.

So, with a cheap loop, I have received, besides all locals, up to August 23, KDKA, KYW, WPG, WOO, WIP, WFI, WLIT, WRC, WSM, WSB, WCAZ, WTAM, WSUI, WGN, WBBM, WJR, WLW, WEBH, CNRO and WGY. I consider this remarkable summer reception, as all were received with good volume on the loud speaker. All except WSUI and WBBM were received before 11:30, as I have never sat up till 2:00 or 3:00 a. m. I am anxiously waiting to see what this set will do in the winter, and can recommend it to anyone. I thank RADIO NEWS for publishing this circuit, and Mr. Lacault for inventing it.

NEIL E. KENNEDY,
206 West 122 Street, New York, N. Y.

Editor, RADIO NEWS:

I have been reading your Correspondence from Readers, and decided I would let the boys all know that I also have the only radio set. I have an L2 Ultradyne that I believe, will do more howling and squeaking and squalling, make more static, entice more radio waves in and lead them over the bus-bar trail, and make more pretty music than any radio set that ever punished a loud speaker.

I will put this set against any other. Here is what it will do: It will bring KFI on the loud speaker on the first stage most any night, summer or winter, with a small loop. With a small loop I can get 500-watt stations on the west coast (2000 miles). I have heard KGU (Honolulu) many times—when using an aerial and ground. It is very selective because it is a "one-spot" super; only three or four stations come in on more than one setting.

WILLIAM G. MARTIN,
Glenview (Lookout Mountain), via Chattanooga, Tenn.

(Let us hope Mr. Martin's nearest radio neighbor is not too close; since he may not enjoy the squeaks so well.—EDITOR.)

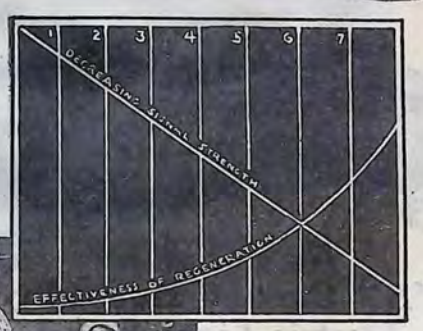
NEW!

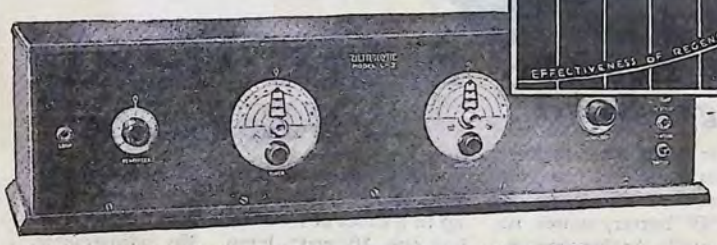
LACAULT'S
CALIBRATED
Short Wave Set
THE IDEAL SET FOR THE SUMMER AND SOUTHERN COUNTRIES

For complete information address
R. E. L. LABORATORIES
—Suite 405—
1931 Broadway—New York

HEADQUARTERS FOR
STROBODYNE
and the latest
R-E-L. 9
Quick Shipment. All Parts

Graph showing how the regenerative effect in the Model L-2 Ultradyne increases as the strength of the received signal decreases.





Why the ULTRADYNE Gets Distance on the Loud Speaker!

The ULTRADYNE Kit

consists of 1 Low Loss Tuning Coil, 1 special Low Loss Coupler, 1 type "A" Ultraformer, 3 type "B" Ultraformers, 4 matched fixed Condensers.

To protect the public, Mr. Lacault's personal monogram seal (R.E.L) is placed on all genuine Ultraformers.

$30.00

Unlike other Super-radio receivers, the Ultradyne, with its exclusive use of the "Modulation System" and special application of regeneration, is capable of detecting and regenerating the faintest signal, making it audible on the loud speaker.

The regenerative effect in the Ultradyne increases as the strength of the signal decreases, until the signal becomes so weak that no amount of amplification will make it audible.

A radical advance in radio engineering and the latest development of R.E. Lacault, E.E., A.M.I.R.E., Chief Engineer of this Company and formerly Radio Research Engineer with the French Signal Corps Research Laboratories.

You will marvel at the unusual selectivity, sensitivity and range of this new Model L-2 Ultradyne.

Write for descriptive circular

How to Build and Operate the ULTRADYNE

32-page illustrated book giving the latest authentic information on drilling, wiring, assembling, and tuning the Model L-2 Ultradyne Receiver.

50c

ULTRADYNE
MODEL L-2
PHENIX RADIO CORPORATION
7-9 Beekman Street
New York City

Don't Wait -for the Announcer!

Once you have marked your favorite stations on the Ultra-Venier silvered dial, all you need is your radio program.

Make your evening's selection. Forget wavelengths. Don't fumble nor guess. The Ultra-Vernier indicator points instantly to the preferred station and tunes it in with infinite precision.

Single control operates vernier for hair-splitting adjustment and governs station indicator. For unprecedented tuning ease, replace your old dials with Ultra-Verniers —today.

Write for descriptive folder.

$2.50

Made by the Hammarlund Mfg. Co. your assurance of quality and dependability—produced solely for the Phenix Radio Corp. At your dealer; otherwise send purchase price and you will be supplied postpaid.

Designed by R.E. Lacault, E. E., A. M.I.R.E. Inventor of the famous Ultradyne circuit. This monogram seal (R.E.L.) is your assurance of Lacault design.

ULTRA-VERNIER
TUNING CONTROL

PHENIX RADIO CORPORATION
3-5 BEEKMAN STREET
NEW YORK CITY

Build it yourself in your spare time

STROBODYNE

8 Tube Receiver Embodies Every Last Word Improvement!

WONDERFUL PARTS—every-one a product of high specialization—such as you never get in factory-built radio.

Last minute improvements you'd never possess were you to rely upon a ready built set.

STROBODYNE is something entirely new and different involving the latest and most scientific developments in radio.

With STROBODYNE

SENSITIVITY means any distant station possible to obtain with wonderful reserve power that largely overcomes fading.

SELECTIVITY means a minimum of interference even in districts abounding with powerful broadcasting stations.

TONE-QUALITY means great power and clarity with absolutely no distortion or blare. Reproduction of speech and music as true and natural in tone as the original.

Official STROBODYNE Book

Write at once, enclosing 50c for all details and 4 constructional layouts on this revolutionary circuit. Learn how simple and easy it is to build, or have a professional set builder construct this "Custom Built" set for you. Address

STROBODYNE

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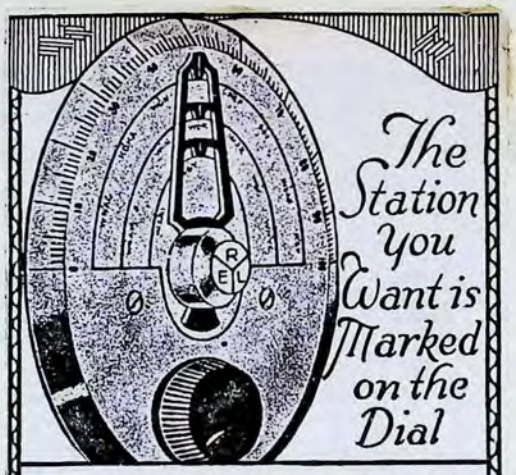


Direct Tuning

Stop fishing for your favorite station. *Select* the program you want—get it lightning-quick. Replace your old dials with ULTRA-VERNIER Tuning Controls. Then, when you have tuned in a delightful station, pencil-record it on the dial. Never again need you guess or fumble for that station, or bother with wave-lengths. Simply turn the finder to your pencilmark, and you hear it!

Designed by R. E. Lacault, E. E., A. M. I. R. E., inventor of the famous Ultradyne circuit. This monogram seal (R. E. L.) is your assurance of Lacault design

$2.50

At your dealers

Made by the Hammarlund Mfg. Co., your assurance of quality and dependability—produced solely for the Phenix Radio Corporation.

★

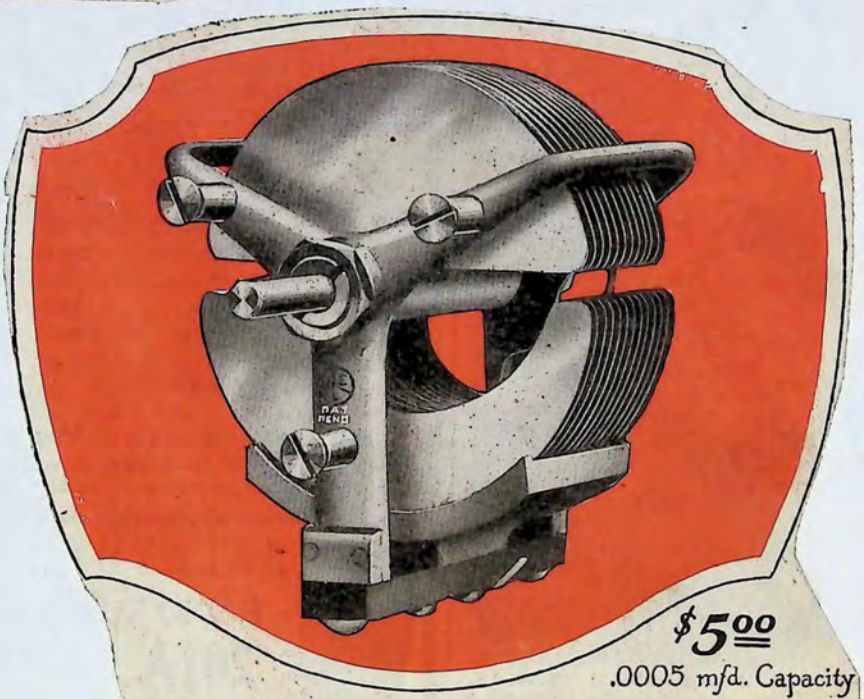
Should you move—or a station discontinue or wave-lengths change—erase the marks, leaving the dial beautifully clean and new. Thus, you may *now* have all the joy of radio, with none of the discouragements. Moreover, the ULTRA-VERNIER is a single vernier tuning control.

At your dealer, otherwise send purchase price and you will be supplied postpaid.

ULTRA-VERNIER
TUNING CONTROL
PHENIX RADIO CORPORATION
5-7 Beekman Street
New York City

RADIO WORLD April 18, 1925

Lacault Scores Again!



$5.00
.0005 mfd. Capacity

ULTRA-LOWLOSS CONDENSER

This seal on a radio product is your assurance of satisfaction and guarantee of Lacault design.

To Manufacturers Who Wish to Improve Their Sets

The Ultra-Lowloss Condenser offers manufacturers the opportunity to greatly improve the present operation of their receiving sets.

Mr. Lacault will gladly consult with any manufacturer regarding the application of this condenser to any circuit for obtaining maximum efficiency.

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All Good Set Builders Should Read

"Super Heterodyne Construction and Operation"

By R. E. LACAULT, E.E., I.R.E.
Originator of the Famous

ULTRADYNE

SUPER HETERODYNE CONSTRUCTION AND OPERATION is a book profusely illustrated and full of practical information for owners and builders of Super Heterodyne receivers. Written in plain non-technical language so that everyone can understand it. Explains the HOW and WHY of each part—how to improve your set—how to locate and remedy troubles—how to build a power amplifier and completely describes the NEW L. R. 4—being the latest design of R. E. Lacault. Clothbound. Illustrated. Price, **$1.97**

SET FULL SIZE DRAWINGS L. R. 4 **$1**

WE CAN IMPROVE YOUR RECEIVER

Our Service Department will make a good set better. Sets wired for power tubes, shielded and rebuilt. All work under the personal supervision of Mr. R. E. Lacault. **Write for Estimate.**

Add Power To Your Set
—MAGNIPOWER—

Designed by R. E. LACAULT

A wonderful new Power amplifier and "B" battery eliminator that can be attached to any set. Economical to operate and makes the poorest set bring out volume and quality. Circular on request.

RADIO ELECTRIC LABORATORIES
Service Dept., 116 WEST 65th ST. NEW YORK
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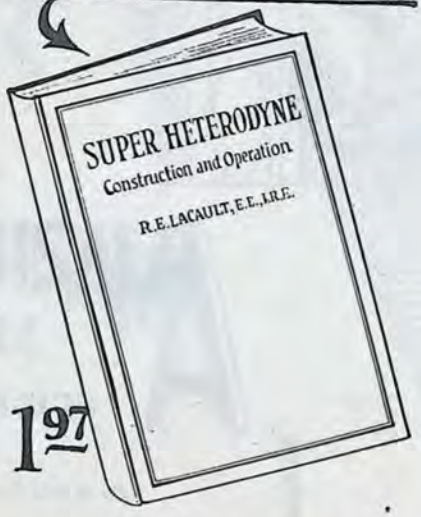
SUPER HETERODYNE

Construction and Operation

By R. E. LACAULT, E.E., I.R.E. *

He has written this book for you



1.97

R. E. Lacault is one of the leading figures of the radio world. His extensive knowledge and experience is based on his intimate association with everything that has transpired since the earliest days of radio. Mr. Lacault is recognized as the leading authority on Super-Heterodyne construction. He has made the study of this interesting subject his life's work. In this remarkable book on this important subject he sets forth in a clear and concise manner the intricacies and fundamentals of SUPER-HETERODYNE CONSTRUCTION AND OPERATION.

For the owners of SUPER-HETERODYNES this treatise should prove to be of great value. There are any number of questions continually arising in connection with the proper maintenance of these powerful and efficient receivers. This handibook will show just how to meet each one of these little difficulties as they arise in the most effective manner and in the way best suited to give you maximum results.

For the radio experimenter, it would be difficult to find a better means of instruction than this thorough dissertation by R. E. LACAULT.

OVER 100 PAGES—CLOTH BOUND, STIFF COVER—FULLY ILLUSTRATED REPLETE WITH DIAGRAMS AND CIRCUITS, ETC. PAY THE POSTMAN $1.97 PLUS A FEW CENTS POSTAGE ON DELIVERY. MAIL YOUR ORDER NOW. SEND NO MONEY.

**R. E. Lacault is the originator and designer of the nationally known "ULTRADYNE." As a Radio Engineer and Editor, he has established an enviable record as the leading authority on SUPER-HETERODYNE construction. In this book by him he passes on to the reader the secrets and discoveries that his many years of practical Radio experience have given him.*

Developed by
R.E. Lacault
what's
new
in radio?
-no panel
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6 Tubes
Completely Wired
$135.00
Write for
Details
ULTRADYNE
MODEL L-3
Out Sept. 10th
PHENIX RADIO CORP.
114 E. 25th ST. N.Y.C.

(1925)

Super Heterodyne Construction and Operation

By R. E. LACAULT, E.E., I.R.E.

Originator of the

ULTRADYNE

is a book full of practical information for the owners and builders of Super Heterodyne receivers. Written so that everyone can understand it. It explains the how and why of each part, how to improve your present set, how to locate and remedy troubles, how to build a power amplifier, and completely describes the latest design of R. E. Lacault:—

The L R 4
PRICE $1.97

Complete set of correct and accurate full size drawings for the construction of the LR4 $1.

LACAULT'S BOOK

GIVES YOU A FINE UNDERSTANDING OF the SUPER-HETERODYNE

R. E. LACAULT, E.E., I.R.E., who died recently, wa one of the outstanding authorities on the Super-Heterodyne. He wrote a book, "Super-Heterodyne Construction and Operation," that explains in a non-technical manner the phenomena associated with a Super-Heterodyne. More, it gives a clear outline of the way such a receiver functions, and naturally gives the clues to solving virtually all the troubles that may arise in a Super.

So thoroughly did Lacault do his wrok that he covered associated topics, thus making his book a sidelight on radio in general, including advice on trouble-shooting.

Therefore the service man, the home experimenter, the custom set builder and the student will welcome this book.

It consists of 103 pages and includes 68 illustrations. It is bound in maroon buckram.

There are three valuable tables in the book, also. One classifies harmonics into groups, e.g., sound, radio, short waves, heat, light, chemical rays, X-rays and "unknown." Another is a trouble-shooting chart, classifying "trouble experienced" and "causes" and referring to the text for specific solutions. The third is a table for converting broadcast frequencies to wavelengths (accurate to .1 of a meter) or for converting the wavelength into frequency.

THE book begins with a comparison of alternating and direct current and proceeds to a discussion of the relation of wavelength to frequency. Then tuning is explained.

Condensers, coils, induction, vacuum tube operation and testing, earphones and speakers, rectification, oscillation, grid condenser action, modulation, grid bias detection, regeneration, beat notes, frequency changing, audio amplification, batteries, aerials, loops, wiring, sockets, and shielding are only some of the other important topics covered.

Besides, there is an entire chapter on the construction of a Super-Heterodyne receiver, with list of parts, front, top and rear views of set, front panel layout, shield dimensional drawings, schematic diagram of wiring and pictu diagrams of the top and bottom views of the subpanel.

LACAULT'S BOOK

"Super-Heterodyne Construction and Operation," giving the master's most masterful exposition of the theory, performance and construction of this fascinating type of circuit, is a necessity to every serious radio experimenter. More than 100 pages and more than 50 illustrations. Buckram cover. This book by R. E. Lacault, **FREE** if you send $1.00 for an 8-weeks subscription for Radio World. Present subscribers may accept this offer. Subscription will be extended.

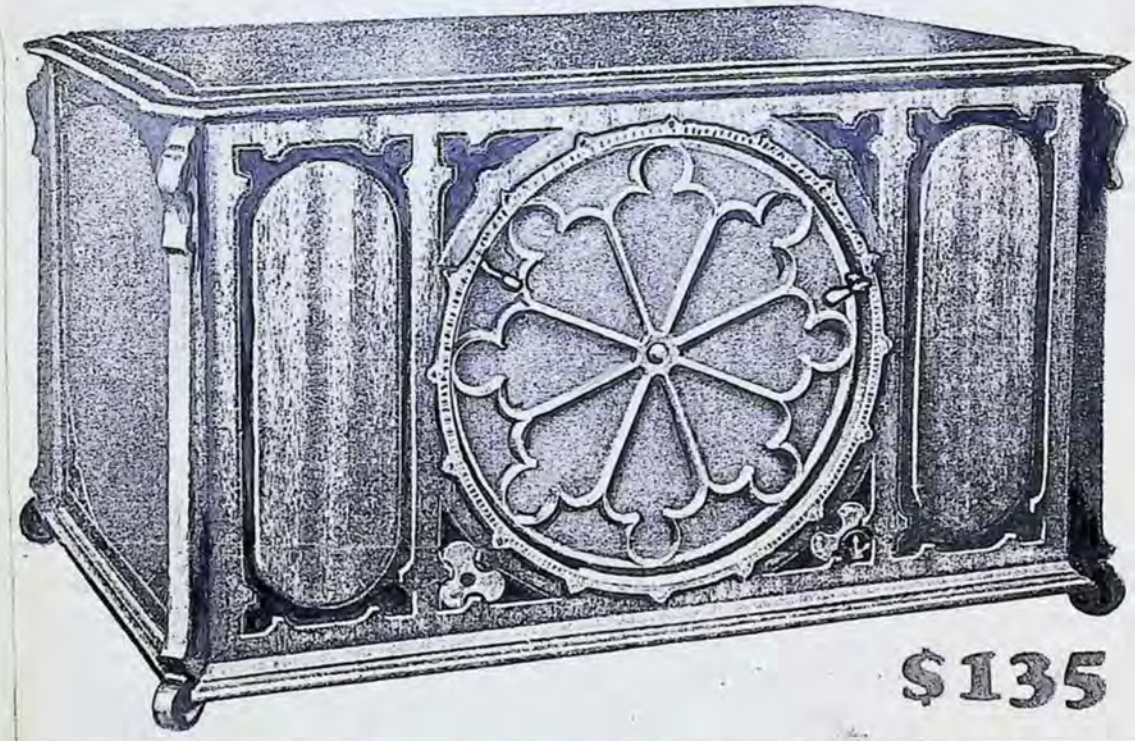
RADIO WORLD 145 W. 45th St., N.Y. City
Just East of B'way

REL
Josh Billings once said—"Success don't konsist in never makin' blunders, but in never makin' the same one twict"—let me help you get the best results from your next set; two heads are always better than one.
REL
We have all the specified parts for the latest circuits including the new—
STROBODYNE
Mr. R. E. Lacault will give free authoritative advice on how to build the latest and best circuits.
The use of specified parts is very important in obtaining GOOD PERFORMANCE, therefore do not substitute to save a few cents and spoil your set. We sell only high grade guaranteed parts.
Send For New Handbook—It's Free
R. E. LACAULT
RADIO ELECTRIC LABORATORIES
116 West 65th St., New York City
Only firm having exclusive services of Mr. R. E. Lacault, E.E.
The Radio Electric Laboratories
Handbook
A Selection of Radio

116-118 SO. WELLS STREET **HUDSON-ROSS** INCORPORATED CHICAGO, ILLINOIS

ULTRADYNE

MODEL L-3



$135

NO PANEL *Built-in Loud Speaker* NO DIALS

Keeping Progress!

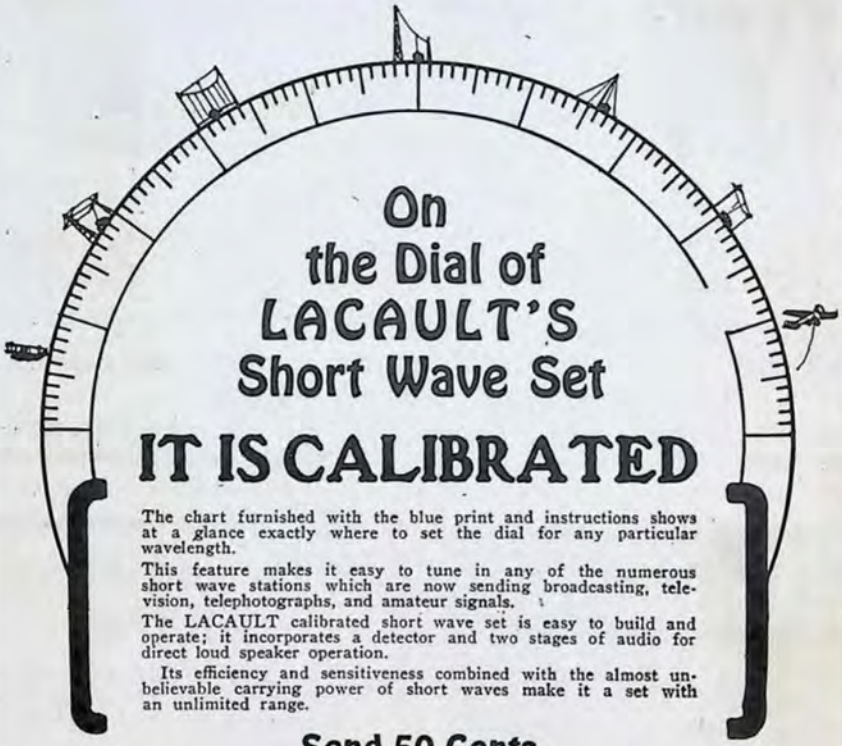
The Ultradyne, Model L-3 is a six-tube receiver employing the fundamental principles of the best circuits, greatly refined and marvelously simplified. No dials—no panel: Just two inconspicuous levers which constitute a station-selector. Duco finished, two-toned mahogany cabinet.

Designed by R. E. Lacault, E. E., Chief Engineer of this Company, and formerly Radio Research Engineer with the French Signal Corps Research Laboratories.

To protect the public, Mr. Lacault's personal monogram seal (R. E. L.) is placed on the assembly lock bolts of all genuine ULTRADYNE Model L-3 Receivers. All Receivers are guaranteed so long as these seals remain unbroken.

YOU KNOW

WHERE THE STATIONS OF THE WORLD ARE



IT IS CALIBRATED

The chart furnished with the blue print and instructions shows at a glance exactly where to set the dial for any particular wavelength.

This feature makes it easy to tune in any of the numerous short wave stations which are now sending broadcasting, television, telephotographs, and amateur signals.

The LACAULT calibrated short wave set is easy to build and operate; it incorporates a detector and two stages of audio for direct loud speaker operation.

Its efficiency and sensitiveness combined with the almost unbelievable carrying power of short waves make it a set with an unlimited range.

Send 50 Cents

for full size constructional blue print, calibration chart, instructions and list of parts.

BE THE FIRST TO BUILD IT!

We are equipped to give you

PROMPT MAIL ORDER SERVICE

Special
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All genuine parts carried in stock

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SCAN THE ETHER WITH The New "222"

STROBODYNE

Combining the proven, hyper-sensitive STROBODYNE system with the tremendous amplification obtained through the use of the new shield grid tubes, in a special circuit making full use of their extra high amplification factor.

The "222" STROBODYNE

Latest Design by

R. E. LACAULT, E.E.

leaves far behind all other types of sets. Its performance has amazed experienced engineers and it has come through hard tests with flying colors.

SPECIFICATIONS

1—QUALITY OF REPRODUCTION
Through the use of high grade audio transformers combined with a push-pull amplifier and the best method of detection, the most remarkable fidelity is obtained. The results will amaze the most critical musicians.

2—VOLUME
The tremendous amplification of the shield grid tubes produce unusual volume which may, however, be regulated to any desired value through a special control.

3—SELECTIVITY
The very high impedance of the shield grid tube, combined with the special circuit used, makes the tuning very sharp without affecting the quality.

4—SENSITIVENESS
The sensitiveness of this receiver is so much greater than that of any existing set that it is beyond comparison. There is NO LIMIT to the range. The noise level is the only factor affecting it.

5—SHIELDING
Entire R.F. system completely shielded.

6—EASE OF CONTROL
Only two dials, a volume control and sensitiveness control are used—making the set easy to operate.

7—STROBODYNE SYSTEM
The STROBODYNE method of reception—a time-tested and proven circuit—is incorporated in the set, causing very weak signals to produce a tremendous response.

8—MATERIAL
Only the very best of tested parts are used in the entire set, insuring permanent high efficiency.

9—DESIGN
The new "222" STROBODYNE is designed by R. E. Lacault, E.E., well known creator of several famous circuits, whose reputation is a guarantee of the high grade radio engineering incorporated in this set.

Radio News for November, 1927

BUILD THE STRODYNE

The Greatest of All Circuits for Performance

The designer of the "Strobodyne" called it, not a new Radio circuit, but an EPOCH in Radio.

Results by hundreds of Strobodyne builders have confirmed his prognostication.

Strobodyne builders are at work in every state of the Union—it has swept the country.

Strobodyne gives:

1. Extreme selectivity enabling you to tune out interference.
2. The ability to receive distant stations as a matter of course, rather than as an event.
3. Unusual tone quality due to the precision and quality of the apparatus used.
4. All the volume you want—undistorted.
5. Extreme simplicity of tuning and adjustment.
6. Easy to build and every product fully guaranteed.

USE THIS OFFICIAL LIST OF PARTS

3 Hammarlund Variable midline condensers .00035 mf.
1 Set Hammarlund Strobodyne coils
3 Hammarlund Shields
2 Hammarlund Equalizing Condensers
1 Hammarlund Brass Shaft 10¼ inches long
2 Samson Symphonic Transformers
1 Samson No. 85 Choke
4 Radio Electric R.F. Units Type F
5 Radio Electric Fixed Matched Condensers
1 Micarta Fabricator Panel 8" x 24" x 3/16"
1 Micarta Fabricator Sub Panel 12" x 25¼" x ¼"
1 Interstate Sales Output Filter
3 Carter No. M-20 Midget Rheostats 20 ohm
1 Carter No. M-400 Midget Potentiometer 400 ohm
1 Carter No. 1 Short Jack Open Circuit
1 Carter No. 2A Short Jack Closed Circuit
1 Carter Imp Battery Switch
1 Cardwell Balancet Type 618A
4 Dubilier By-Pass Condensers .5 mf. Type 907
1 Dubilier Fixed Condenser .002 mf. Type 601
8 Benjamin Sockets UX Type 9040
12 X-L Binding Posts
2 National Co. Dials
4 Radiall Amperites Type 1A
1 Radiall Amperite Type 112
1 Electrad Royalty Variable Resistance Type B
2 25 ft. coils Belden Colorubber
7 CeCo Vacuum Tubes Type 201A
1 CeCo Vacuum Tube Type 112
1 Fritts Cabinet for Panel 8" x 24" x 12½"

OFFICIAL CONSTRUCTION BOOK NOW READY

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I enclose 50c. for one copy of the official construction book, giving all data on the STROBODYNE, and all supplementary information.

Name .....
Address .....
City .....
State .....

Super Heterodyne Construction and Operation

By R. E. LACAULT, E.E., I.R.E.

is a book full of practical information for the owners and builders of super heterodyne sets. This is written so that anyone can understand it and should prove particularly useful to those who do not obtain the expected results from their home made sets, as the trouble shooting chapters are very complete.

Other chapters include—

The how and why of each part. Trouble shooting chart.
How to check and match your tubes. How to build a power amplifier, etc.

and

COMPLETE CONSTRUCTIONAL DETAILS ON THE

L R 4 -- Price $1.97

Set of four full size drawings for the assembling, construction and wiring of the LR4—$1.00.

R. E. LACAULT RADIO ELECTRIC LABORATORIES, 1931 BROADWAY, NEW YORK CITY, Dept. 1A

Manufacturers of the
MAGNIPOWER and ANODYNE
High power amplifiers and plate supply.
Write for literature describing these REL products.

ULTRA-LOWLOSS
CONDENSER

SPECIAL CUTLASS PLATES DISTRIBUTE THE STATIONS EVENLY OVER THE DIAL. SIMPLIFIES TUNING. CAPACITY .0005 MFD.

$5.00

PHENIX RADIO CORP., 116-F East 25 St., N.Y.C.

HOW TO MAKE A RADIO-PHONE RECEIVING SET

By ROBERT E. LACAULT
Associate Editor RADIO NEWS

25¢

A non-technical book for the beginner. Gives complete constructional data on the building of a complete Crystal Detector Set, Tuning Coil, Loose Coupler and a Single Audion Tube Set with Amplifying Units. It furnishes all dimensions and working drawings of every part that must be constructed by the amateur. Written in plain, simple language that anyone can understand. The opening chapter gives a complete description of the theory of radio and tells what it's all about, teaching the principles of wireless so that the constructor knows what he is doing.

48 Pages, 26 Illustrations
Bound in Beautiful Two-Color Cover
Size, 5½x7½ inches. Prepaid 25c.

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SEND FOR OUR LIST OF SPECIALS. THE LOWEST PRICES IN THE COUNTRY.

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116 West 65th St., NEW YORK CITY

LATTER-DAY "ULTRADYNE" NOTE

The WORLD'S GREATEST *All-Wave* SCREEN GRID SUPER

ULTRADYNE

ULTRADYNE BOOKLET

Send 25c for this booklet which tells how to construct and operate the Ultradyne MODEL L-32 Receiver. This booklet also contains life-size picture diagrams and lay-outs of the entire set; also, life-size wiring diagram of the entire circuit showing every wire location and connection.

ULTRADYNE KIT

The kit contains 3 specially tested and matched Ultraformers with double compensating condensers in aluminum sealed cans, 1 special steel chassis drilled and pierced as per specifications, all ready for mounting, three rubber grommets and 4 coil mounting pillars and INSTRUCTION BOOKLET.
List Price $32.50

Operates entirely from A.C. Line
Completely Shielded Throughout
Covers All Wavelengths from 15 to 600 Meters
Tunes as easily and smoothly on the short wave as it does on the broadcast band
10 K. C. Selectivity Over Entire Band
Selectivity and Sensitivity so great, distance range is unlimited
Power Detection
Push Pull Amplification
Full Natural Tone
Not a Trace of Hum or Distortion
Steel Chassis
Simplified Construction

Mr. H. W. Duley of Brooklyn, N. Y., reports he logged 74 stations in one night.

MODEL L-32

- for TONE, DISTANCE *and* SELECTIVITY

The model L-32 Ultradyne, with the Dynatron oscillator, works equally as well on short waves as it does on the broadcast band.

An Ultradyne receiver operating in New York City, easily tunes out WOR, Newark, and brings in WLW, Cincinnati, without a trace of interference. Likewise, WMAQ, Chicago, is brought in without interference from WEAF, New York; KGO, Oakland; KSL, Salt Lake City; KFI, Los Angeles; KOA, Denver; XEN, Mexico City, to mention a few, have been logged regularly. Short wave stations from all over the world have been copied on the Ultradyne Receiver.

The Super-sensitive Plio Dynatron system of radio reception responds to weaker signals than the conventional method having far greater selectivity and providing tuning ease that is unmatched. Ultradyne performance is the envy of the radio industry.

TRAUL RADIO CO., 1074 Atlantic Ave., Brooklyn, N. Y.

After the death of Robt. E. Lacault in 1929, his widow Alice attempted to carry on the business, but quickly sold off in 1930 Lacault's rights and patents to several manufacturers. There was the to-be-expected attempt by such firms to capitalise on the "Ultradyne" fame, but the sets produced were quite conventional.

They offered nothing new that would distinguish them or sell them from a dozen other similar sets on the market. The cut shown above gives the general idea. While the "Ultradyne" name in fact, survived until around 1935, its glory passed with Lacault.

POST-LACAULT ADVERTS

NOTES

R.I.Co.
ULTRADYNE
R. F. TRANSFORMERS
Our own engineers have built and tested these technically perfect transformers for use in the Ultradyne or standard Super-Heterodyne Receivers. Sold on money back guarantee.
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How to Build
ULTRADYNE
Model L2
12 page illustrated book with detailed instructions on drilling, wiring, assembling and operating Model L-2 Ultradyne Receiver. Latest Authentic edition by R. E. Lacault—A. M. I. R. E., inventor of the Ultradyne—the most selective receiver known. Write for descriptive circular.
Phenix
Radio Corp.
5-9 Beekman Street
New York
50¢

and now~
Forget Wavelengths
IN the Arabian Nights story, the words "Open Sesame" magically—instantly—opened the door. The ULTRA-VERNIER Tuning Control is the "Open Sesame" to any station once difficult to find, or stumble upon.
Simply pencil-mark any station on this cleverly contrived beautifully silvered dial. Then forget its wavelength—turn the finder to your mark, and, without awaiting the announcer, know you hear this pet station.
Moreover, the ULTRA-VERNIER is a single vernier tuning control. Replace your old dials with ULTRA-VERNIER Tuning Controls—today!
1. This alignment is the gauge for penciled station records.
2. Operates vernier for hair-splitting adjustment.
3. Takes standard condenser shaft lengths—easy to mount.
4. Penciled station records easily erased from silvered dial.
R E L
Designed by R. E. Lacault, E.E., A.M.I.R.E., inventor of the famous Ultradyne circuit. This monogram seal (R. E. L.) is your assurance of Lacault design.
Made by the Hammarlund Mfg. Co., your assurance of quality and dependability—produced solely for the Phenix Radio Corporation. At your dealer; otherwise send purchase price and you will be supplied postpaid.
$2.50
Write for descriptive circular.
ULTRA-VERNIER
TUNING CONTROL
Phenix Radio Corporation
7-9 Beekman Street
New York City

ON COMMERCIAL EXPLOITATION

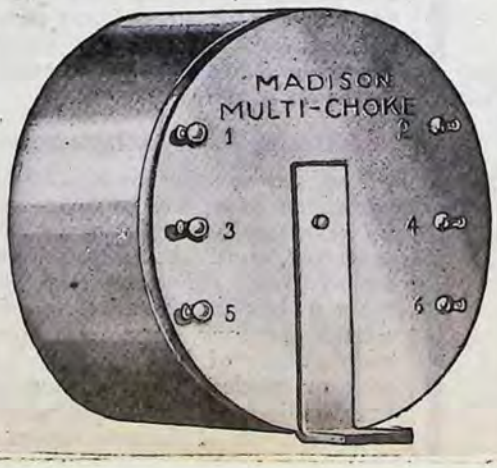
For His New "LR 4"
R. E. Lacault *specifies*
HAMMARLUND
Condensers and Coils

In the early days of Radio it was a common practice among parts manufacturers to bally-hoo the use of their parts or component by such-and-such a designer or in such-and-such a circuit. Thus, an advert for a given circuit or set could list the names of practically every major parts manufacturer. Perhaps it was mutual support.

As long as Lacault was designing and producing parts under his own name, parts manufacturers could not exploit him. However when he began specifying off-the-shelf items for his latter-day circuits, manufacturers were quick to exploit his name.

The two cuts shown here are good examples of practices in vogue, on the one hand; as well as emphasising the authority attached to Lacault's name, among home-constructors and commercial firms.

Madison Multi-Chokes



QUADRI-WOUND
as specified for the
"LR-4"
Lacault's Greatest Success!

Intensive Advertising Campaign

R. E. Lacault and the Phenix Radio Corporation, realizing the enormous proportions of their achievement, are throwing every resource and ounce of energy into the most ambitious advertising program of their history. They do not intend to hide this newly discovered "light" under any "bushel". Every corner of the radio world is to be told about this perfect answer to the demands, the criticisms, the suggestions that have been most frequently discussed by prospective purchasers. General magazines, radio publications, newspapers, and displays will announce this new era of radio reception. It will arouse interest, explain superiorities, and stimulate action until the most indifferent are forced to ask for a demonstration of the ULTRADYNE Model L-3. Dealers are furnished with attractive counter and window displays.

ULTRADYNE MODEL L-3

R. E. Lacault, Chief Engineer of the Phenix Radio Corporation, claims to have perfected the much talked about, frequently predicted, "ideal receiver". Although there may be some reasonable differences as to his claim, there certainly can be no question about the improvements he has introduced in this model. The ULTRADYNE Model L-3 is an entirely new kind of radio receiver.

There are no dials. The familiar shiny panel with all its plugs, switches, graduation marks and so forth, is missing too. When you look closely at it you see two small levers and inconspicuous scales around the outer rim of the central, circular design, which covers the mouthpiece of the built-in loud speaker. These two levers, which constitute the station selector, and a volume adjustment are the only controls. The cabinet is a splendid piece of modified Italian Renaissance furniture, in two-tone, panelled mahogany. Placed upon a console table, mantle, bookcase, or library table, this cabinet would appear to "belong" there, so finely does it blend with its surroundings. It would be taken for a writing paper cabinet or usual table piece sooner than a radio set. This unobtrusive and truly artistic appearance overcomes the familiar objection to radio in the finely appointed home—the objection that the "laboratory or machine look" of the usual radio receiver jarred and appeared out of place in a carefully planned scheme of furnishings. It was, of course, inevitable that radio should have to eventually conform with the dictates of good taste which demand harmony, quiet beauty, and inconspicuous efficiency.

For a six-tube receiver, the Model L-3 ULTRADYNE is remarkably easy to operate. Stations are located with two small levers with the precision and ease that you operate a dial telephone. As for distance, tone clarity, selectivity and the usual qualifications of a radio, the makers have intensified the efficiency of the principles embodied in this receiver to a higher point than ever attained when used in any other set.

Here is as great an array of convincing talking points as any dealer could possibly desire. He is not selling "just another receiver"—but an entirely new kind of receiver. He does not have to harp on the old arguments of distance, volume, selectivity and so on. He has something new to talk about. With a set actually embodying these refinements so often and so widely demanded, any dealer ought to do a tremendous business. At the present time, the ULTRADYNE Model L-3 has a clear field. There is no other receiver like it on the market. The ULTRADYNE dealer has the edge on every competitor.

Not every dealer can become a representative for this new receiver. The Phenix Radio Corporation is reserving the right to select their jobbers and dealers according to their ability to sell this receiver into the better type homes. Distribution is to be based upon calibre of store, standing in the community, facilities for adequate service, and policies. The ULTRADYNE Model L-3 is to be identified only with the better class of dealers.

The Experimenter for July, 1925

How to Build The Ultradyne (Model L-2)

by R. E. Lacault, E.E., A.M.I.R.E.
formerly Associate Editor, Radio News

How You Can Build This Remarkable Super-Heterodyne In Your Own Home

A Home Built Ultradyne

ULTRADYNE
MODEL L-2

This Coupon is Worth 25¢

PHENIX RADIO CORPORATION, EXP.
114 East 25th St., New York City.

Gentlemen: Enclosed find 25c in stamps, together with coupon valued at 25c, for which please send me your regularly 50 cent priced Book of Instructions on "How to Build and Operate Ultradyne Model L-2."

Name .....

Address .....

Super-Selective

The ULTRADYNE is a simplified and improved Super-Heterodyne, employing the "Modulation System," an entirely new principle in radio reception just developed by R. E. Lacault, A.M.I.R.E., who spent four years in research work in the Radio Division of the French Signal Corps.

This new principle is of such a nature as to increase the sensitivity of the set over that of any known receiver—reduces to a minimum the controls employed, making the set easier to tune. Weakest signals are made to operate the loud speaker, because the "Modulation System" provides greater rectification.

The ULTRADYNE, in addition to the "Modulation System" incorporates every good feature of the Super-Heterodyne.

SELECTIVITY—Completely cuts out all local stations at any time and receives distant ones clear and distinct. One degree variation of dial tunes out completely one station and brings you broadcasting never received before.

SIMPLICITY—In tuning there are only two dials to adjust for all wave lengths. These are vernier dials, which can be calibrated for all stations.

RANGE—Brings in distant stations that other receivers fail to get under the same conditions. Covers the whole broadcast wave length range. Truly a remarkable receiver of unusual merit.

ULTRAFORMERS
Types "A" and "B"

Especially designed radio frequency transformers for use in the ULTRADYNE receiver. Type "B" may be successfully employed in any super-heterodyne circuit as radio frequency transformers

$5.00

Send for thirty-two page illustrated book giving complete details on "How to Build and Operate the Ultradyne."

50c

Write for descriptive circular

PHENIX RADIO CORPORATION

3-9 Beekman Street **New York City**

ULTRADYNE
The Improved
SUPER-HETERODYNE

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